ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

nufacturers'
rectory

RIL 1939
Graw-Hill Co. of
fornia . . . 25c

Thrill her on Mother's Day with a Sunbeam Automatic Mixmaster
$2.50 ONLY DOWN
EASY TERMS A WHOLE YEAR TO PAY
Order Now FROM YOUR DEALER OR THROUGH YOUR EDISON OFFICE

Look at this Special Offer
★ A Combination Every Housewife Will Want...
The Famous Sunbeam Ironmaster and The New RED-JID Ironing Board
AT A SAVING OF NEARLY 1/3
REGULARLY
$13.90
But you pay only
NOW
$9.95
ORDER NOW FROM YOUR DEALER OR THROUGH YOUR EDISON OFFICE

Edison Advertising

SELLS SMALL APPLIANCES AND WIRING, TOO

In the magazine "Electrical Times" which reaches nearly 400,000 Edison consumers, the Edison Company is continually featuring the convenience and economy of small electric appliances in the home. Year after year, this idea is driven home in stories and pictures and display advertisements. This effort is largely responsible for the fact that Southern California dealers are maintaining fine records in appliance sales.

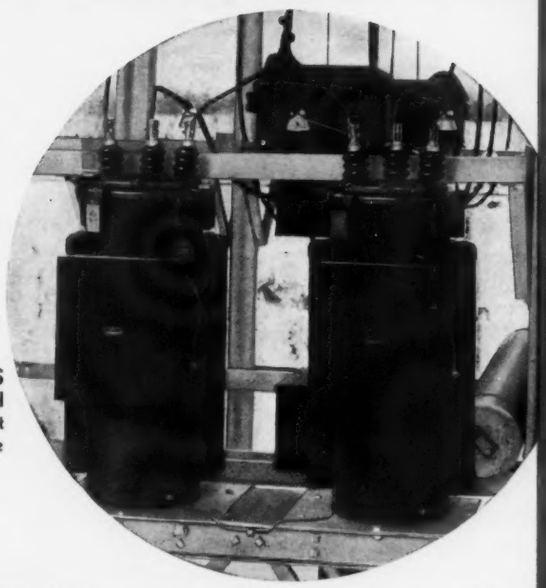
This constant increase in the number of new appliances builds up an additional demand for more adequate wiring facilities in new homes and old ones, too.

Thus Edison advertising benefits dealer, contractor, manufacturer, and wholesaler as well as utility. It's a 5-way activity in which all have a vital share.

Scoop!
BIG TRADE-IN OFFER
$2.00 FOR YOUR OLD ELECTRIC COFFEE MAKER REGARDLESS OF MAKE OR CONDITION
TOWARD THE SENSATIONAL NEW Sunbeam COFFEEMASTER
PRICE $19.00
$3.00 DOWN
AT YOUR DEALER OR THE EDISON OFFICE

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

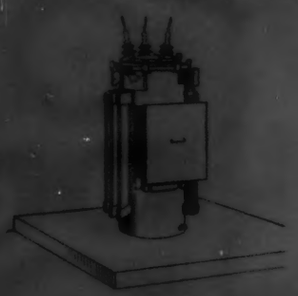
Look What You Can Do with This NEW Low-cost G-E Induction Voltage Regulator



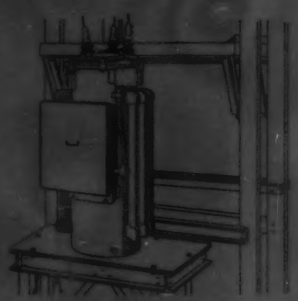
Here are Type BIRS regulators installed on a branch circuit of a New York State utility

TYPE BIRS
Single-phase, 60 cycles
2400-v, for 50- and 100-amp
4800-v, 25- and 50-amp

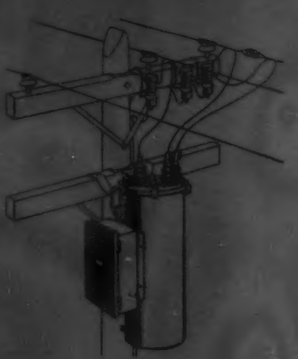
Install it indoors or outdoors at the station



For floor mounting



Or platform mounting



For crossarm mounting on branch feeders

THIS new Type BIRS induction voltage regulator supplements our improved Type IRS regulator, which we announced last fall.

Like the improved IRS, this smaller brother can be installed indoors or outdoors at stations; but, in addition, it can also be pole-mounted for maintaining smooth, close, and dependable regulation on small individual feeders and branch circuits of larger feeders.

By comparison with previous designs, our new Type BIRS regulator

Costs Less to Install

1. Same unit suitable for floor, platform, or crossarm mounting.
2. Only three line connections to make.
3. Cover bushings with clamp-type solderless connectors simplify line connection.
4. Regulator shipped oil-filled, ready for installation.

Costs Less to Inspect

1. Detachable control cabinet can be mounted at base of pole.
2. Control cabinet can be mounted 90 degrees from pole for ready inspection.
3. Hinged control panel can be swung out for ready access to back connections.

Costs Less to Maintain

1. Motor stops quickly without use of a brake.
2. Small amount of current required by motor-control relay greatly reduces voltmeter contact duty.
3. Continued quiet operation.

We think you will welcome this newest addition to our family of regulators. Its development is a continuation of our policy of giving you more economical, flexible, and dependable regulating devices for every part of your system. Ask your G-E representative for publication GEA-2018C or write General Electric, Dept. 6—201, Schenectady, N. Y.

VISIT THE GOLDEN GATE INTERNATIONAL EXPOSITION, PAINTED WITH LIGHT BY GENERAL ELECTRIC

GENERAL ELECTRIC

350-145

BETWEEN THIS MONTH'S COVERS

Question Answered

WHAT IS THE ELECTRICAL INDUSTRY? (p. 23): Even electrical men have long taken the electrical industry for granted. It's time, therefore, to stop and see what the industry is. The answer is immediately obvious. You, the manufacturer, wholesaler, contractor, dealer, utility, are the industry. Not only is your work a link in the chain, but many of you are the investors, either direct or indirect, that finance the industry. Credit must also be given to other people upon whom we are dependent. The architect, inspector, educator and physician—all serve as advisors. And the customer is, of course, the reason for our existence. These facts — this recognition of what the electrical industry is—are important. We should remember them in going about our daily work . . . Such is the conclusion of this article, which was recently presented at the PCEA meetings throughout California and in Reno.

Lighting the Streets

PROTECTION FOR SERIES STREET LIGHTS (p. 26): Relays constitute the brains of electrical circuits. In protecting series street lights they have an exacting task, because slight increases in lamp current will accelerate the rate of lamp failures. It is lamp-circuit current, rather than current in the constant-potential circuit, which needs protection. A comparatively simple protective scheme was worked out and effectively applied at Cashmere, Wash. It is described by K. L. Howe, who is engineering supervisor for Westinghouse at Seattle.

REBUILT TRANSFORMERS DEFY OLD AGE (p. 29): Changing from arc to incandescent units is typical of many street lighting modernizations. This entails a change in transformer facilities. Portland General Electric Co. reports satisfactory service from old arc-lamp constant-current transformers which were rebuilt for the new 6.6-amp. service. C. J. Scoville, who is assistant shop foreman in the Electrical Maintenance and Construction Dept. of Pepco, describes the process and the results.

Getting Better

SINGLE-PHASE ARC WELDERS (p. 27): Low power factor and high demand in proportion to the amount of energy consumed have made welders troublesome to many utilities. Manufacturers are improving their equipment in these respects and there is an opportunity for utilities to stimulate the trend which is carrying welding toward the more-desirable-load stage—so suggests this Northwest Assn. report.

Rolling Equipment

SPECIAL UNITS AUGMENT MODERN FLEET (p. 31): The Los Angeles Bureau has begun to use a truck with a 72-ft. tower, adjustable in three dimensions, for washing insulators on bureau lines. It carries its own water and can deliver a 1,000 lb. spray. Insulator washing is regular maintenance for most systems. H. J. Martin of the Bureau's General Plant Division also describes design of standard trucks which the Bureau builds of Cor-ten steel.

Northwest Meeting

ASSOCIATIONS (p. 33): Gathered in Portland last month were members of the Business Development Section, NWEL&PA. One thought permeated the various speeches: That the electrical industry must convince, not the government, but the home-town public that private power companies can do a better job of distributing Bonneville and Grand Coulee power than any public agency.

Displays

DRESSING STORE WINDOWS (p. 36): Electrical dealers in Berkeley, Calif., are so numerous that competition between them is more intense than in many other cities. In setting up window displays, therefore, they are forced to use a lot of ingenuity. Generally speaking, they're divided into two schools. The smaller dealers believe in filling their windows with a great many different appliances; the large dealers believe in displaying only a few appliances. Both kinds of dealers maintain that their particular method of dressing windows attracts most customers.

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Cover: Graybar Electric supplying the needs of a contractor. Photo by Schoeb.

More Sales

SALES PARADE (p. 38): In at least two parts of the West, dealers are organizing to sell more appliances. In Spokane, the Inland Empire Electrical Equipment Assn. has been formed to reach a $3,300,000 market. In British Columbia, the Electrical Service League is seeking membership among small-town dealers in order to tie in with the drive for $3,390,000 worth of sales . . . The value of advertising how economical it is to use an electric range is proved by Southern California Edison's recent "discovery survey." Asked to estimate the cost of cooking three days' meals, Edison customers sent in over 5,000 answers.

Contracting

LIGHTING & WIRING (p. 48): In order to maintain service at all times and keep equipment flexible enough to make changes readily, Associated Oil has a duplicate set of facilities for every piece of equipment . . . Most motor and repair shops ignore the value of promotion. Not so Frank Andrews of Modesto, Calif. He rents a downtown store window in which he displays various equipment plus all the trade magazines he buys . . . People like the exotic. So the Gilbert Craftsmen, of Albuquerque, cater to this desire by manufacturing all kinds of lighting fixtures in old Mexican designs. Business is good.

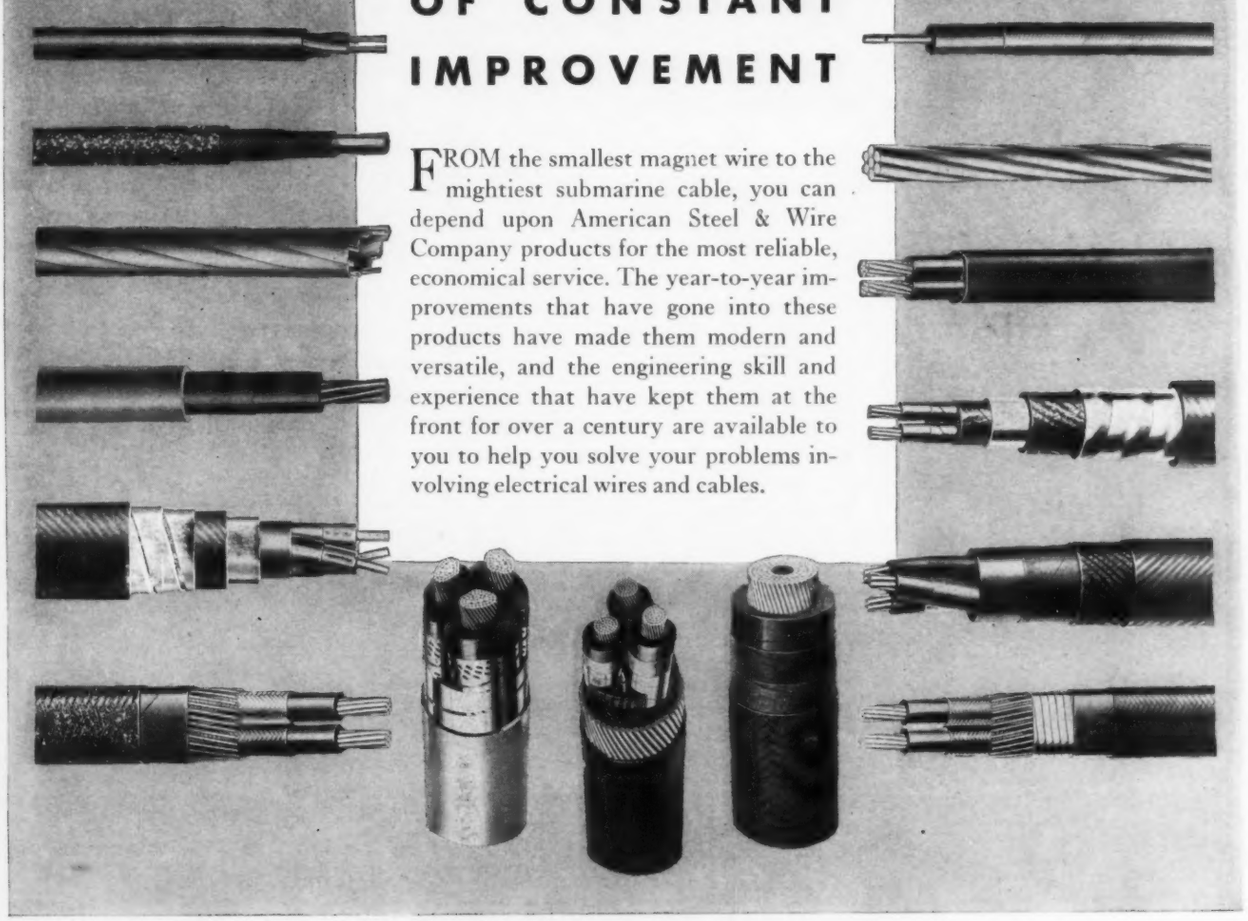
Next Month

URBAN DISTRIBUTION. What kinds of facilities do the electric utilities use to serve the cities of the West? How will these facilities be changed as load densities increase? How must these changes be adapted to changing economic-social conditions as well as to improvements in electrical equipment and construction methods? These questions will be discussed in the May issue by three engineers who are prominently identified with systems serving large Western cities. John Bankus, assistant chief engineer of Portland General Electric, will edit the symposium and comment on the survey of 12 Western systems.

100 Years

OF CONSTANT IMPROVEMENT

FROM the smallest magnet wire to the mightiest submarine cable, you can depend upon American Steel & Wire Company products for the most reliable, economical service. The year-to-year improvements that have gone into these products have made them modern and versatile, and the engineering skill and experience that have kept them at the front for over a century are available to you to help you solve your problems involving electrical wires and cables.



COLUMBIA STEEL COMPANY · *San Francisco*

Pacific Coast Distributors of Electrical Wires and Cables for American Steel & Wire Company

United States Steel Products Company, New York
Export Distributors

UNITED STATES STEEL

PRINT IN BINDING

Cophite-39

TRADE-MARK

An improved metal-graphite slip ring brush for synchronous converters of ANY make

"Cophite" 39 Brushes develop and maintain a thin film of uniform character on the ring surface, giving stability to performance under all load conditions. These brushes have high carrying capacity for a grade of relatively high graphitic content. They are recommended for current densities up to 125 amperes per square inch.

An enviable record of improved performance has been made by "Cophite" 39 brushes on the numerous applications that have been made since its comparatively recent development. Excellent records of brush life and exceptional freedom from selective action, dusting and ring threading, have characterized its performance.

A feature of the Type VL Shunt Connection, shown in the above illustration, is the double coil, steel spring, lock washer (patented) which maintains uniform contact pressure on the cable and uniformly low electrical resistance at the connection.

THERE IS A **NATIONAL** CARBON, GRAPHITE OR METAL-GRAPHITE BRUSH FOR EVERY TYPE OF EQUIPMENT

TRADE-MARK

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide UCC and Carbon Corporation
Carbon Sales Division, Cleveland, Ohio
GENERAL OFFICES
30 East 42nd Street, New York, N. Y.
BRANCH SALES OFFICES
New York Pittsburgh Chicago San Francisco

USE THIS COUPON *if you desire our representative to call and quote on "Cophite" 39 brushes for your converter equipment or recommend a suitable grade of "NATIONAL" brushes for some other class of service.*

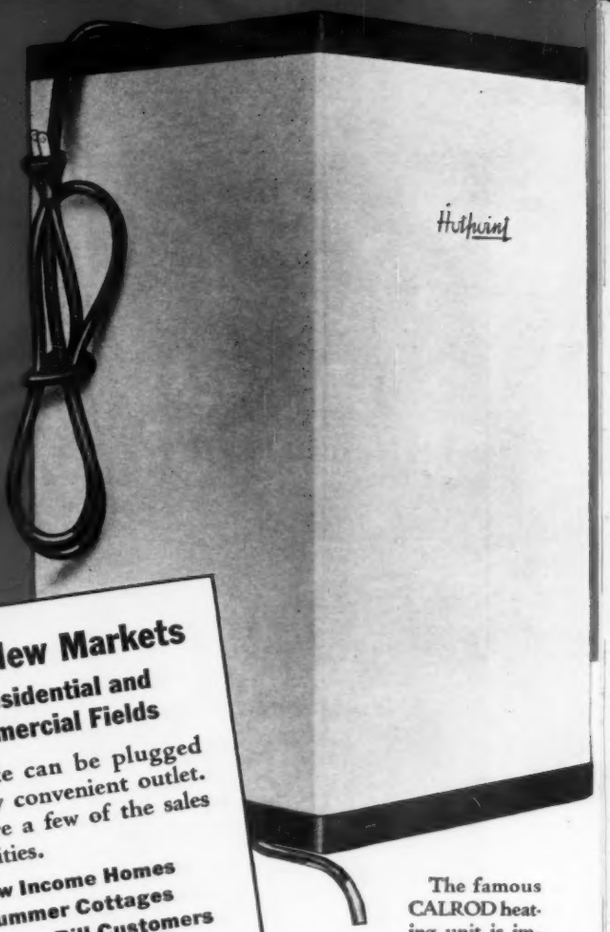
*Name*_____ *Position*_____ *Company*_____

*Address*_____ *City*_____ *State*_____ EW

Hotpoint

OFFERS A NEW PORTABLE (NON-PRESSURE) WATER HEATER

with Vast New Sales Possibilities



The famous CALROD heating unit is immersed directly in the water. Heats quickly, efficiently, economically.

Let this low-cost, fast-selling Hotpoint Electric Water Heater open your market to profitable water heater sales.

Use Voguette to educate prospects to the safety, cleanness and dependability of electric water heating and make money at the same time.

Of two gallon capacity, Voguette is easily and quickly installed. It offers the simplest, safest, cheapest method of heating small quantities of water. Costs less than heating water on the range.

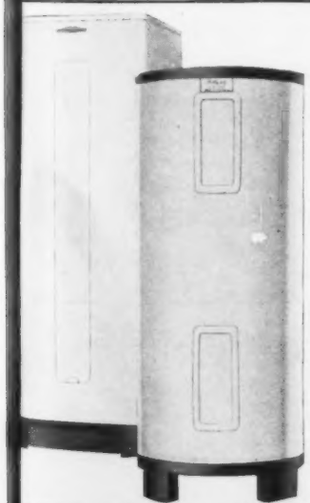
Get all the facts today and use Voguette to cultivate your territory for standard installations of Hotpoint Automatic Electric Water Heaters.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

Open New Markets in Residential and Commercial Fields

Voguette can be plugged into any convenient outlet. Here are a few of the sales possibilities.

- Low Income Homes
- Summer Cottages
- Minimum Bill Customers
- Filling Stations
- Soda Fountains
- Tourist Cabins
- Roadside Stands
- Barber Shops
- Small Taverns
- Rest Rooms
- Doctor's Offices
- Dentist's Offices



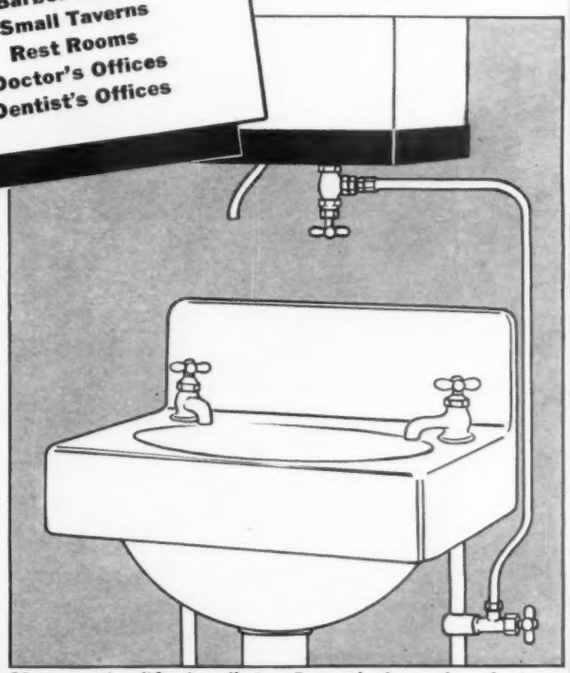
HOTPOINT OFFERS THE MOST COMPLETE LINE

Hotpoint offers a full line of electric water heaters in capacities from 1 to 140 gallons. A size for every need.

THE VOGUE. Hotpoint's popular rectangular-type water heater, smartly-styled for the modern home. Adaptable to kitchen, bathroom or basement installation — and commercial use.

THE MASTER. Hotpoint's famous round-style water heater, finished in white with contrasting black trim. Fully automatic and dependable. Economical to operate.

LEAD WITH HOTPOINT—THE LEADER OF THE INDUSTRY



Voguette simplifies installation. It may be hung above basin or sink. Plumbing connections are simple. No special wiring necessary. Just plug into any convenient outlet.

BE READY TO REAP THE BENEFITS OF INDUSTRY CAMPAIGN

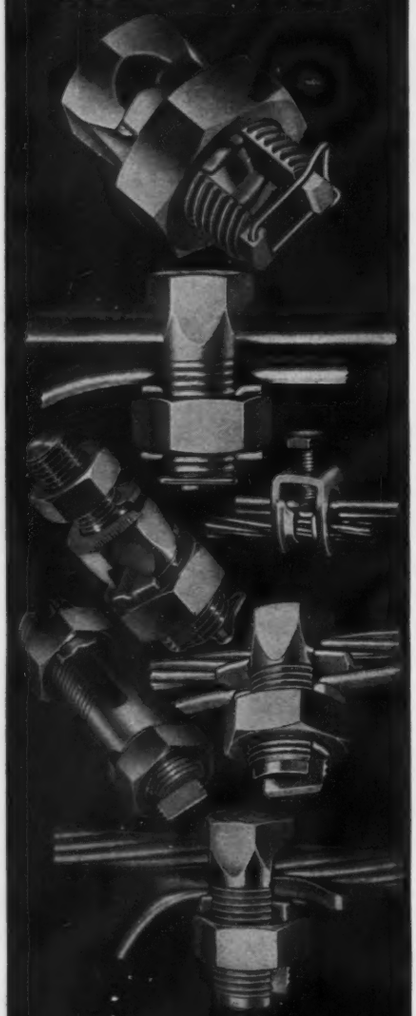
Tie up with the Modern Kitchen Bureau Water Heater Campaign. Promote Electric Water Heating. Get your share of profitable business. Write for information to The Modern Kitchen Bureau, 420 Lexington Avenue, New York, N. Y.

ER Hotpoint HEATERS

ELECTRIC RANGES · REFRIGERATORS · WASHERS AND IRONERS · DISHWASHER-SINKS

Reliable

SOLDERLESS CONNECTORS



Reliable connectors are available for use with all types of conductors. Tap connectors for copper, copperweld, aluminum and steel conductors and for guy strand are manufactured with precision threads to maintain high pressure solderless connections.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE • CHICAGO ILLINOIS

NEW PRODUCTS

Insulators (450)

Described as highly effective in the elimination of radio interference noises is the treatment being applied to a new line of insulators introduced by R. Thomas & Sons Co. Metallic oxides are applied to critical surfaces before glazing so that ceramic bonds are subsequently formed between oxide and glaze and porcelain. Glaze protected, the oxides are as permanent as the insulator; and, being unexposed, are not subject to electrolysis effects. Included in the line are pin-type, switch or bus and suspension-strain insulators.

Universal Ranges (451)

Eight new Universal ranges have been announced by Landers, Fray & Clark. They vary in size from a three-unit, one-oven range to four-unit, two-oven ranges. The oven is said to reach baking temperature of 400 deg. in 6 to 7 min. It uses current only about 30% of the time the cooking process is going on. Controlled temperatures as low as 150 deg. permit use of the oven as a warming compartment. The Universal economy cooker replaces a hot plate into which fits either a 5-qt. cooking vessel or two 1½-qt. aluminum pans which may also be used in the range oven for cooking two different foods. The two-in-one super-heat surface unit offers selective heats to suit the size of the utensil used and to concentrate the heat where needed. High operates both inner and outer units: Medium operates inner unit only for small utensil cooking; Low provides the minimum heat on both units. Overlapping flange rims on the surface units prevent spilled liquids from seeping through to the wires beneath.

Florence Range (452)

Outstanding in Florence Stove Co.'s new line of ranges is the deluxe model. Surface units include three Chromalox units, two standard and one extra large, and a deep-well cooker—all controlled by five-heat switches. The oven is equipped with a baking element, a broiling-and-browning element, a smokeless broiler grille with pan and automatic oven lamp.

Coffee Filter (453)

The original Cory glass filter rod for use in coffee makers was introduced by Glass Coffee Brewer Corp. last year. Now comes a new rod which is said to be greatly improved in speed and filtering efficiency. Engineers devising the rod have changed the angle of filtering, increased the filtering surface and added somewhat to the weight. The rod will fit most existing models of coffee makers and brews coffee or tea without the use of filtering paper or cloth.

New reflector photoflood

Photoflood Lamp (454)

Radically different photoflood lamp which includes within its bulb both light source and reflector has been announced by both General Electric and Westinghouse. It is designed to simplify the taking of better pictures by photographers. Called Mazda Reflector Photoflood No. R2, the lamp produces a cone of light covering about 60 deg. Color of the light is about the same as that of conventional photoflood lamps, thus insuring good color radiation in black and white films. It is also recommended for color photography. This is made possible through use of a new high-efficiency filament and special aluminum surface of high reflection factor hermetically sealed within the bulb. Circular end of the photoflood is inside frosted. Its medium screw base fits the usual socket.

Conduit (455)

Twice protected against corrosion is Walker's Dualcote conduit. Result is that it is safe from salt water, acids and caustics. The Walkerizing process is said to guarantee a uniformly distributed coating of zinc on the inner as well as the outer walls of the conduit. It actually alloys the zinc with the steel. This process is also said to have the added advantage of leaving a zinc surface adapted to the holding of the second protective coat. This outer finish, says Walker, "contains a new, inert ingredient which is practically indifferent to chemical reaction. This substance

(Continued on Page 10)

When requesting more information on New Product and Product Data items cut out this coupon, paste it on the back of a postcard and mail to

Electrical West
883 Mission Street
San Francisco, California

Please send me the following CHECKED items:

New Products:	450	451	452	453	454	455	456	457
	458	459	460	461	462	463	464	465	466
Product Data:	401	402	403	404	405	406	407	408

Name .....

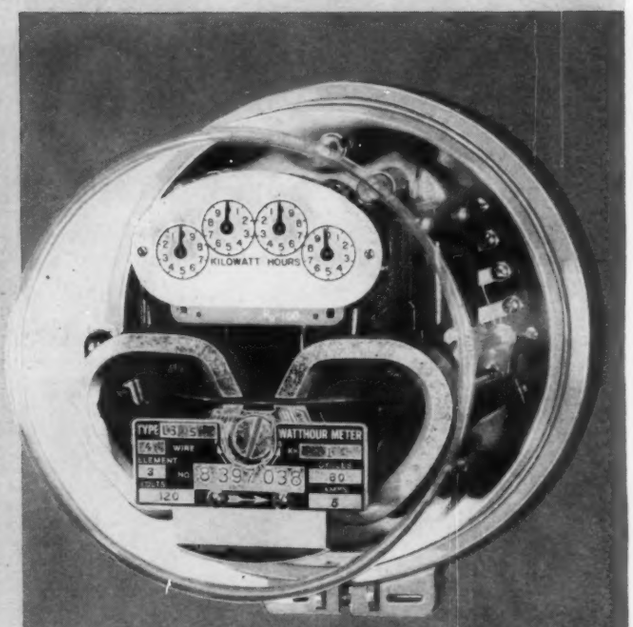
Address .....

.....

Announcing

A DEVELOPMENT IN THE ART OF METERING

The Sangamo Type L-3 Single Disk, Three Element, Watthour Meter—the first of its kind to be developed for the American Market—is the latest contribution to the art of metering. Conforming in design with the present-day trend for small, compact size, its electrical characteristics, also, meet all modern metering requirements. Type L-3 meters are built with three complete electromagnetic elements driving a single laminated disk. For use on 4 wire, 3 phase circuits, this type completes a line of Sangamo Single Disk Meters which covers the entire field of polyphase metering.

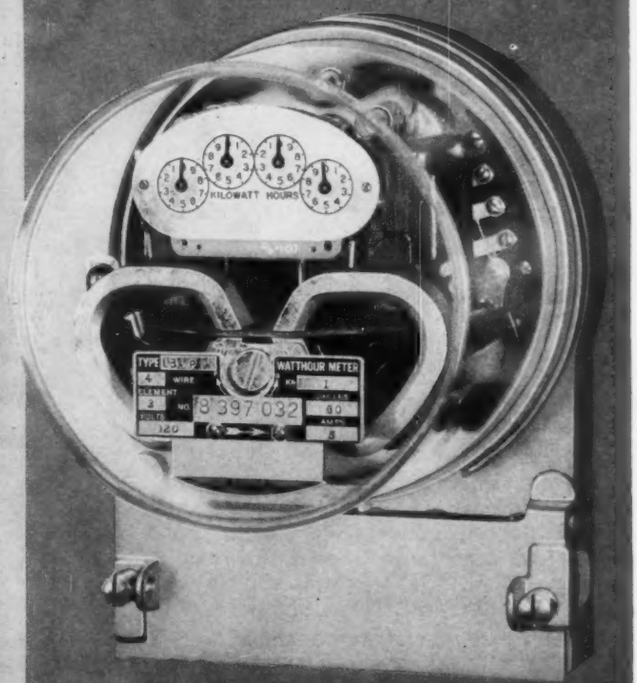


Type L-3-S

TYPES L-3-P AND L-3-S

The two standard types are: the Type L-3-P bottom-connected with conventional polyphase terminal block; and the Type L-3-S for socket mounting. The Type L-3-P has the same general external dimensions as Sangamo Type L-2-P Meters. In the Type L-3-S self-contained meter, the dimensions and terminal arrangement are identical with those used in Sangamo Type L-2½-S Meters; while the transformer type is adapted to the new sockets with the potential connections centrally located.

A new Addenda to Bulletin 91 contains the technical description, outline dimensions, connection diagrams, and list prices of Sangamo Type L-3 Meters.



Type L-3-P

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

CUT OPERATING

REDUCE OPERATING COSTS WITH ALLIS-CHALMERS POWER TRANSFORMERS!

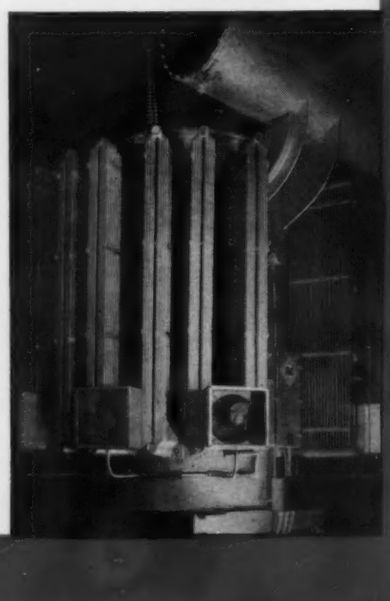
When you purchase Allis-Chalmers Power Transformers, you get these extra features that insure you of more efficient, money-saving operation at no extra cost:

Oil-Sealed Inert Gas Protective system reduces replenishments of costly nitrogen . . . cuts maintenance costs!

No-Load Tap Changer gives you safer, more efficient operation . . . easy to get at . . . saves your operators' time!

Uni-Directional Breather reduces oil filterings!

Make your transformer dollars go farther with Allis-Chalmers Power Transformers! Send for Bulletin 1182.

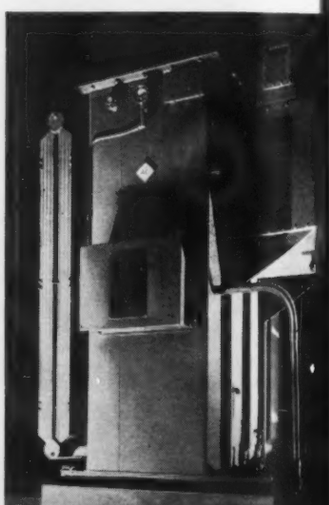


ALLIS-CHALMERS 5/8% HALF CYCLING STEP REGULATORS COST LESS TO OPERATE ... REGULATE MORE CLOSELY ... GIVE BETTER SERVICE!

The smaller the size of step . . . the closer the regulation! And Allis-Chalmers 5/8% Half-Cycling Steps . . . the smallest on the market today . . . give you regulation so smooth, it's practically stepless!

And, what's more, Allis-Chalmers Regulators do the job with many less operations! Fewer tap changes mean longer contact life for you! Complete oil immersion of all moving parts cuts friction to a minimum.

Get the details on all the exclusive features you get with Allis-Chalmers 5/8% Half-Cycling Step Regulators. Write for Bulletin 1170-C.



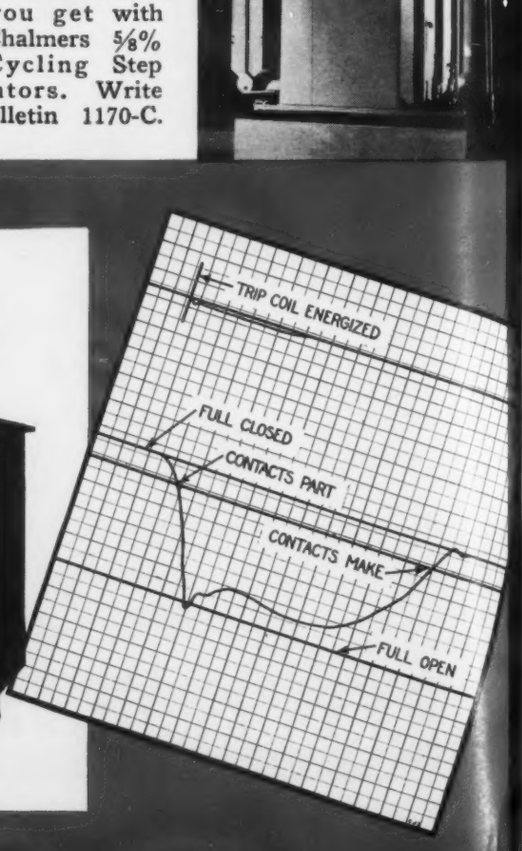
CUT SERVICE TRIPS!

Are your operating costs mounting because of costly, time-wasting servicemen's trips to outlying installations?

Then it's important to you to see the Allis-Chalmers Oil Circuit Breakers with high-speed reclosing operators! The typical speedgraph record shown here proves that COC operation time is well within the new NEMA standard.

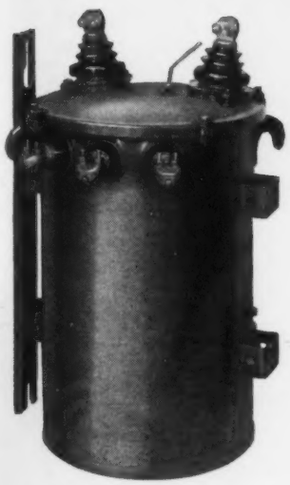
That means your outage time is cut . . . customer satisfaction is increased . . . revenue is sustained!

But Allis-Chalmers Oil Circuit Breakers with high-speed reclosing operators offer you more advantages than that! Get in touch with your nearest Allis-Chalmers District Office for complete details.



COSTS!

Read How You Can Cut Generating and Transmission Costs ... Maintain Customer Satisfaction ... Keep Profit Margins Steady ... Get More Power Per Dollar Spent ... With Allis-Chalmers Equipment ... the Equipment that Pays for Itself!



GET BETTER SERVICE AT LOWER COST WITH ALLIS-CHALMERS DISTRIBUTION TRANSFORMERS!

Allis-Chalmers Distribution Transformers . . . well designed . . . time-proved . . . fit into your operating practice . . . are readily adaptable to changing service or load conditions.

You get surge protected design . . . solderless connectors and stud bushings . . . bushing coordination!

Get better service at lower cost with Allis-Chalmers Distribution Transformers. Bulletin 1173 gives you the whole story. Write for your copy today!

Here's how you can go after those extra profits! You can't do much about most of the items on your profit and loss statement . . . they're fixed. But . . . you can cut operating costs!

That's why progressive operators specify Allis-Chalmers! They know they get equipment that's engineered to cut costs . . . to stand up under years of tough treatment without running up service charges . . . without shutting down operations with frequent breakdowns!

When you install Allis-Chalmers equipment, you get equipment that's designed to meet your needs. Trained engineers, backed by Allis-Chalmers' long experience of serving both ends of the power line, give you installations that keep output constant . . . give you more power per dollar spent! Customer satisfaction is maintained . . . profit margins kept steady!

Look at the equipment on these pages! It's modern . . . up-to-the-minute . . . yet time-proven in thousands of installations all over the world!

And the research progressing continually in the Allis-Chalmers laboratories and those of associated companies keeps you in touch with all the latest engineering advances and discoveries.

Get in touch with your nearest Allis-Chalmers District Office today! Get all the facts on how you can cut operating costs . . . keep profit margins steady . . . with Allis-Chalmers equipment . . . the equipment that pays for itself!

1019

DISTRICT OFFICES:

SALT LAKE CITY, UTAH — KEARNS BUILDING
LOS ANGELES, CAL. — ROWAN BUILDING
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ELECTRICAL DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

KLEIN
"Lightweight"
CLIMBERS

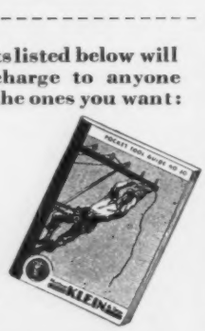
Klein "Lightweight" Climbers are built to the minimum weight possible consistent with maximum safety. Every pair is tested exactly the same as are the old time tried Standard Climbers. The lineman can throw his weight on these climbers with confidence —they are Klein's!

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Lightweight Climbers.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ Klein Kord Fabric Safety Straps.
- ☐ Pocket Tool Guide.



Mathias KLEIN & Sons
Established 1857 Chicago, Ill. U.S.A.
3200 BELMONT AVENUE

is carried in a vehicle which dries by evaporation rather than by oxidation, and consequently relies on no oils that can be broken down by corrosive agents."

Coffee Maker Safe (456)

Devised some time ago by Hill-Shaw Co. was a "wall safe" to prevent breakage of glass coffee makers. A simple, metal contrivance, it was anchored to the wall, thus offering a safe place to store coffee makers. Until recently the safe has been sold only by Hill-Shaw. Now, however, it has redesigned the safe to fit any make of coffee brewer. Retail price as a separate item: 75c.

Fly Trap (457)

A new portable, all-metal, electrified, burnout-proof fly trap which kills all flies and flying insects instantly is now being made by Chicago Electric Scientific Co. The trap is 12 in. wide, 22½ in. long and 4 in. high. It is

made of heavy-gage sheet steel with a baked-enamel finish, and is equipped with a built-in transformer and a 6-ft. rubber cord. User simply plugs the cord into any 110-120-volt a.c. socket. Although current supplied is deadly to all insects, it is said to produce only a stinging sensation to the finger tips.

Handy Plug (458)

General Electric Supply Corp. and Graybar Electric Co. are now distributors for the Handy plug manufactured by Albany Sales Co. of N. Y. (ELECTRICAL WEST, Oct. 1938). This is the plug which is installed without use of tools or screws. Wires are merely separated and inserted, after which the cap is screwed into place.

Four-Foot Fluorescent (459)

A 4-ft.-long fluorescent lamp—12 in. longer than the longest type to date—was made available by General Electric and Westinghouse April 1. Only 1½ in. in diameter, the lamp comes in two colors, daylight and warm white. It is believed that, where space permits, a system of 48-in. lamps will cost considerably less to install and to operate than a similar system employing shorter lamps.

Fluorescent Reflector (460)

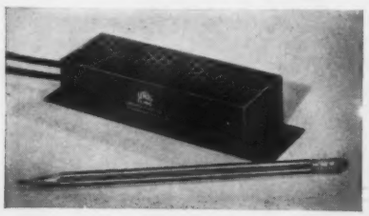
Especially designed for applications of the fluorescent lamp and Wiremold fluorescent strip is Wiremold's concentrating-type reflector. This is manufactured in the three lengths of the fluorescent lamp (18, 24 and 36 in.) and is made of specular-finish aluminum having a coefficient of reflection in order of 83-85%. The reflector is so made that it incorporates the advantages of the parabola for effective and efficient control of light and has an adjusting feature which permits setting in any one of three positions.

Fluorescent Fixtures (461)

Benjamin Electric Mfg. Co.'s new "Flur-O-Line" fluorescent lamp units are unit-section-reflector type, single-tube fixtures designed for easy and practicable attachment end-to-end or side-by-side so as to make it possible to build up from a number of basic unit-sections almost any size and shape of composite, multiple-lamp fixtures to light large surfaces of inspection and assembly tables and long production lines. In addition, each unit is a self-contained fixture in itself and is designed for the numerous industrial locations requiring only a single lamp fixture. In the basic reflector design is incorporated a detachable wiring channel which houses auxiliaries and conceals the wiring. Cast aluminum end-plates give rigidity to reflector assembly and prevent sagging or distortion when unit-sections are ganged together.

Resistors for Fluorescent (462)

International Resistance Co.'s resistors are specifically designed for use with fluorescent lamps and their auxiliaries on d.c. circuits. So constructed as to provide maximum heat dissipation in minimum space, these resistors



will operate at a temperature rise of from 40 to 50 deg. C. with fluorescent lamps. They are of the wire-wound type, fully protected against moisture, and having 1,250-volt insulation. Tolerance is plus or minus 5%. The units are supplied in small metal boxes, approximately 6x2x1 in., ready for quick installation.

Pocket-Type Indicator (463)

Ideal Commutator Dresser's Hi-Volt pocket-type indicator is used for indicating the presence of potential when held in the changing static field such as is found surrounding a.c. circuits, condenser discharges, static from belting. The glow tube lights up instantly in a field—it is not necessary to touch the conductor carrying the potential. It gives positive indication on 2,000 volts and up. Equipped with a clip, it slips into any vest pocket.

Fireplace Log (464)

Although most people like fires in fireplaces, there are some unfortunates who cannot have them. For these people, Copeland-Gibson Products Corp. is making the Wolverine Fireplace Log. Built of white birch, the logs are non-burning. "Nevertheless," says Copeland-Gibson, "you will marvel at the actual similarity to that of a burning grate fire, accomplished through the medium of electric light bulbs and rotating unit, the latter actuated from bulb heat rays. Its action creates reflection of logs burning as well as smoke arising from the reflection in the fireplace." Installation is made merely by inserting plug of attached cord into nearest outlet. Three models are available.

Range Unit (465)

Edwin L. Wiegand Co. calls its new three-ring, 2,000-watt, 230-volt Chromalox super-speed range unit an outstanding development. The unit is of concentric ring design; the all-flat top has a cooking area 8 in. in diameter. It is designed to produce five different heats when used with a five-heat switch and connected to three-wire service. Thus, on "high" switch position all three rings are energized for a total rating of 2,000 watts. "Medium" gives 1,400 watts, confined to the

(Continued on Page 14)

IN WIRING SPECIFICATIONS FOR EVERY TYPE OF BUILDING

Include

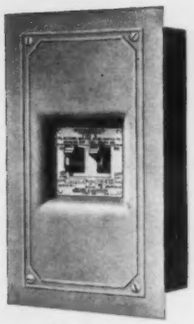
MULTI-BREAKERS

● For small, medium and large homes—commercial buildings—industrial plants—there is a Square D Multi-breakeR for every kind of installation.

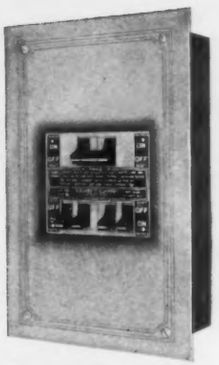
The Square D Multi-breakeR, in its many forms or combinations, provides circuit breaker protection at surprisingly low cost. It can be used as service equipment or for load center distribution. It provides branch circuit switching.

Many architects now specify Square D Multi-breakeRs. If they are not included in specifications, contractors should show their clients the advantages of this modern convenience. They can sell better installations—at a greater profit.

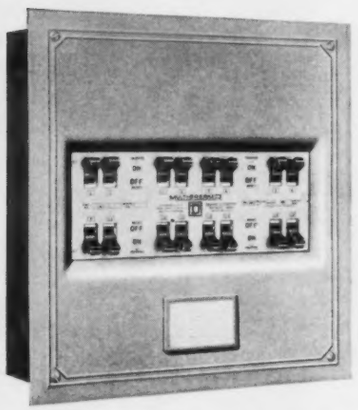
Square D electrical equipment is available through electrical wholesalers everywhere.



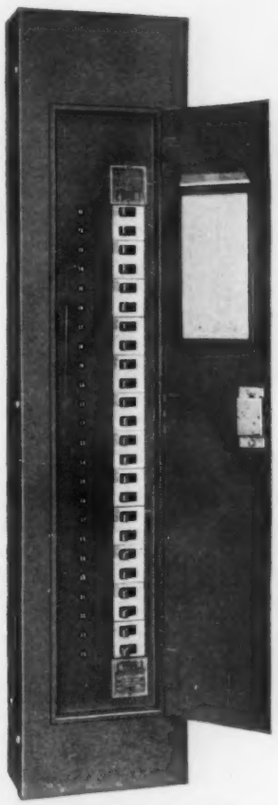
● For the cottage or for addition of range or water heater. Type M, one or two circuits.



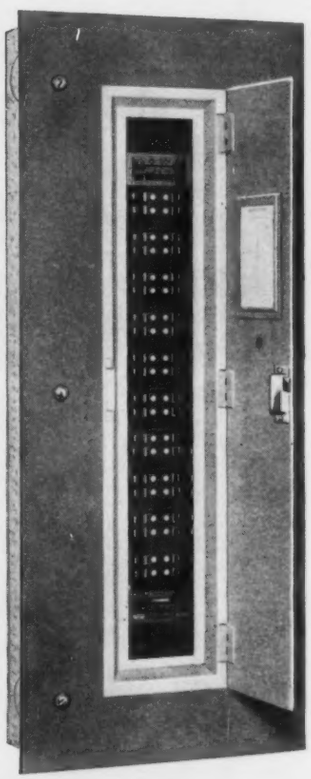
● For the medium-sized home. Service center up to six circuits; load center up to eight.



● Multi-breakeR Load Center. Branch circuit protection and switching up to sixteen circuits.



● Multi-breakeR Panelboard Narrow-Column Type for industrial installations.



● Multi-breakeR Panelboard up to forty circuits.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

HERE ARE 2 NEW
BIG VALUES AND P

THE MANCHESTER—Hotpoint's Spring sales headliner. Its streamlined styling is especially designed for installation in the modern All-Electric "Ensemble" kitchen. The Manchester is a popular priced range equipped with many of the features of Hotpoint's higher priced models. Full porcelain enamel. Has three 5-Speed Select-A-Heat Calrod units. 6-quart Thrift Cooker. Oversized Directional Heat Oven with Direct-A-Heat switch. Duo-Speed Broiler unit. 3 Large utility drawers. Make this your volume leader.

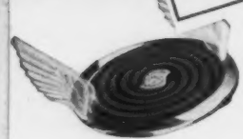
Swing into a big Volume Range Bus ness with these New Hotpoint Mode and the Spring Swing Sales Plan

Hotpoint offers two new popular pri ranges with high-quality features f Spring Selling. Now you can go after t big volume sales which electric men eve where predict for 1939.

Get the facts about these high-quali big value Hotpoint Ranges. Use them leaders for your spring sales drive. E show the complete line of Hotpoint rang with new 5-Speed Select-A-Heat Calro Duo-Speed Broiler and Directional Ho Oven to catch all buyers.

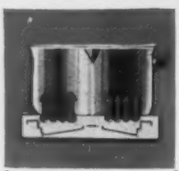
It's Spring—Swing Ahead with Hotpoint's Spring Swing Campaign

EDISON GENERAL ELECTRIC APPLIANCE CO.,
5612 West Taylor Street, Chicago, Illinois



Calrod

COOKING UNIT TARGETS THE HEAT



1
Calrod heat is conducted straight through bottom of pan into food.

2
Calrod heat is efficiently applied —without waste. It is all used for cooking.

3
Calrod heat is accurately controlled. Five different speeds from one switch.

A NEW SALISBURY—Hotpoint's new lower pri model of the popular Salisbury. A big value range w 5-Speed Select-A-Heat Calrod units and plenty of Sa Appeal. Looks like the more expensive model, except u in warmer drawer of this Salisbury operates without th mostat. Lower cost timer clock and black condiment j

Hotpoint

REFRIGERATORS . . . WATER HEATERS

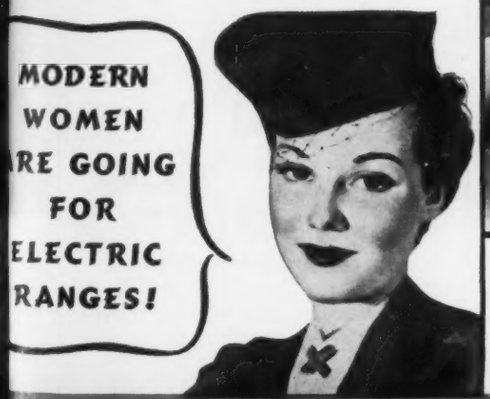
PRINT IN BINDING

HOTPOINT RANGES
POPULAR PRICES!

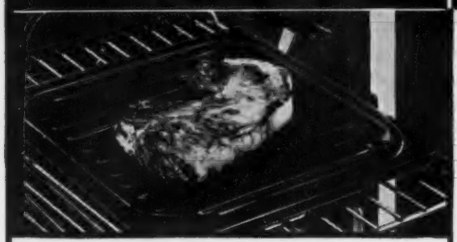
Hotpoint tops the list with big-value merchandise, more sales and advertising help, more features, more cooperation, more assistance.

Swing Ahead With Hotpoint!

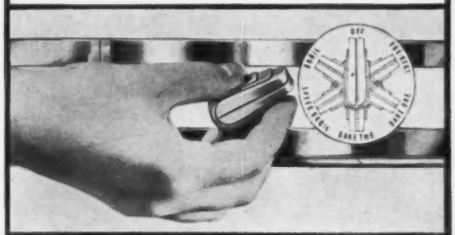
Hotpoint's streamlined style and abundant sales features win the plaudits of smart buyers. Take the easy road to profitable sales. Lead with Hotpoint, the electric range that is easiest to sell because it is preferred by most buyers.



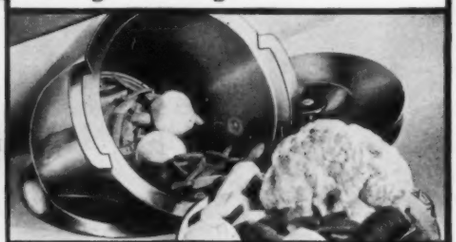
FEATURES



Duo Speed Broiler—Choice of full "Hi-Speed Broil" for charcoal type broiling or lower temperature "Broil" for barbecuing, toasting and broiling well-done meats. Ideal for steaks, chops and fowl.



Directional Heat Oven—Large, oversize automatic oven, with top and bottom heat controlled by one switch. Gives choice of methods, improves baking or roasting results.



Whole-Meal Thrift Cooker—Six quart capacity. Cooks complete dinner without watching. Saves time. Hotpoint cuts cost of cooking.

NATIONAL ADVERTISING

Here's Real Sales Power for You. Hotpoint advertising is timed to tie up with the big Modern Kitchen Bureau "Guess Again" Campaign in the Saturday Evening Post. In addition Hotpoint advertising will appear in five other national magazines through your heavy selling season.

SPRING SWING CAMPAIGN

Swing with Hotpoint's "Spring Swing Campaign" and make this the biggest season in the history of your business. See the new Plan Book with direct-mail material, lively newspaper and outdoor advertising and window and store display material.

GUESS AGAIN

Modern Kitchen Bureau Campaign

Hotpoint offers material to help bring the big "Guess Again" Campaign into sharp selling focus for you. Tie up with the M. K. B. Spring Drive. Use Hotpoint's Spring Swing Sales Plan. Material can be adapted to your individual needs. Newspaper mats, posters, direct mail, window and store display and all material for a complete spring sales activity are now ready.

Electric Ranges

DISHWASHER-SINKS . . . WASHERS AND IRONERS

BURNDY LUGS

BURNDY Engineering Co., Inc.
459 East 133 St., N.Y.

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

Automatic MIXMASTER
Double Automatic IRONMASTER
SILENT AUTOMATIC TOASTER
Automatic COFFEEMASTER
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Ill.
316 Commercial St., Los Angeles, Cal.
1619 Shenandoah Dr., Seattle, Wash.
224 S. W. Temple St., Salt Lake City, Utah
49 YEARS MAKING QUALITY PRODUCTS

outer and inner rings. "Center" gives 600 watts, confined to the middle ring. "Low" gives 350 watts, confined to the outer and inner rings. "Simmer" gives 125 watts distributed over the entire unit.

Adjustable Socket (466)

To overcome the difficulty of adapting new sizes of lamps to existing equipment, Goodrich Electric Co. has produced an adjustable socket which provides vertical adjustment for the proper positioning of lamps in reflectors. The device is provided with two slotted prongs. A slotted ring which holds a resilient, spring-suspended socket completes the assembly. By compressing the prongs, you can adjust the socket vertically to four positions so that changed light centers can be properly located in existing reflector equipment. The adjustable socket is offered in two sizes.

PRODUCT DATA

401:

"The Art of Protective Relaying" is one of the best General Electric booklets published to date. Fifty-one pages of almost solid text (with very little advertising, incidentally) give about as complete a story as possible. Indicative of the scope of the publication is one small section of the table of contents. Listed under "General Relaying Practice" are: "Back-up protection and selectivity; disconnection of defective elements; fundamental considerations; methods of obtaining selectivity; overlapping of protected zones around circuit breakers; tripping speed." Other major heads in the contents include: "Application Tables of Standard Relays;" "Checking Performance of Relay System;" "Modernization of Relay Systems;" "Protection of a.c. Buses, a.c. Rotating Machines and d.c. Rotating Machines;" "Mercury Arc Rectifiers," and "Transformers." If you want this information, send the coupon to Electrical West and ask for bulletin 401.

402:

Anaconda Wire & Cable Co. claims in a new booklet that there are six reasons why its Star Ground Rod is the best buy: It is corrosion resistant; it offers protection against galvanic or electrolytic action; its six-point, star-shaped cross section provides greater contact area than a round rod; its shape provides rigidity in driving; grooves of the rod furnish simple, speedy and dependable ground lead connections; high tensile strength, one-piece construction, wide range of available diameters and lengths and high salvage value of copper fulfill all requirements for either temporary or permanent driven ground. After this introduction, the booklet goes on to give some valuable engineering data on grounding. Whether you want this data or more information on the ground rod itself, Bulletin No. 402 is worth reading.

403:

Here's one of the most complete descriptions of equipment that has been published in a long time. It's a 16-page illustrated booklet telling about Westinghouse's small distribution transformers. Discussed are the completely self-protecting Type CSP, 1½ to 50 kva.; surge-protected Type SP, 1½ to 100 kva., and the conventional Type S, 1½ to 100 kva. They are single-phase, 60-cycle transformers for standard voltages of from 2,400 to 7,620 delta or star connection, and for 11,500 and 13,200-volt delta-connected circuits. Your copy of this all-inclusive pamphlet may be had by checking No. 403 on the coupon.

(Continued on Page 16)

TORK CLOCKS

NEW ELECTRICALLY DRIVEN 1939 MODELS NOW AVAILABLE

WITH PLAIN OR ASTRONOMIC DIALS

Whenever it is desired to turn Current on and off Regularly there is a new model Tork Clock that can do it.

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Representatives:
A. R. Slimmon, 445 E. 3d St., Los Angeles
Nicholas & Cook, 1063 Howard St., S. F.
H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

SALES REPRESENTATIVE AVAILABLE

For Southern California—Arizona

A sales maker who can and does sell is seeking to contact manufacturers desirous of active, intelligent, personalized representation. Can furnish proven record of ability, complete knowledge of territory and immediate business from friendly contacts of years standing. Suitably financed and interested in both supply and merchandising lines. For full particulars address:

LLOYD R. HANLON
1237 No. Sweetzer Ave. Los Angeles, Calif.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue
We have been making safety tools for 24 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

Electrical West
For Birthdays

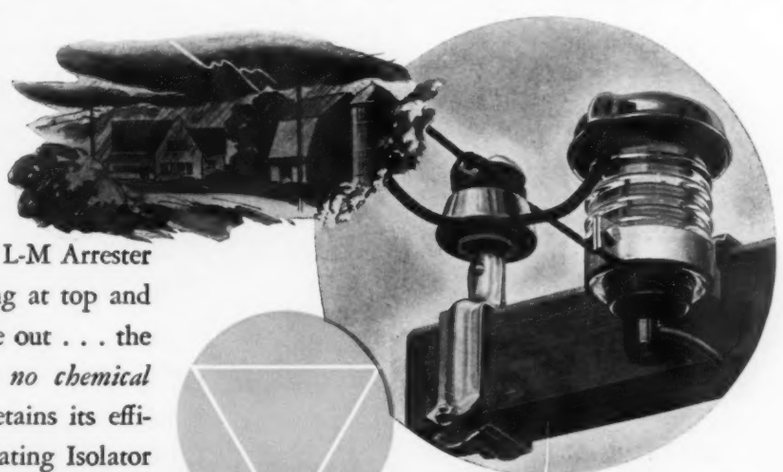
It's tough when the kid gets so blasé he doesn't enjoy ties or books or pens for his birthday. But it's no problem at all if he's in college or school, training to enter the electrical industry.

Give him a head-start on his classmates. Give him Electrical West, the all-industry magazine of progress.

YES, sir, Spring means *more* than bursting buds . . . Spring means bursting clouds, flashing lightning, greater need to protect your service with L-M Lightning Arresters.

On both your rural and urban lines L-M Arrester protection *assures* continued service with low maintenance through the lightning hazards of 1939, and many a year to come. See the L-M Arrester for yourself. Look through its transparent, heat-proof glass housing and note how quickly and easily you can inspect it *on the line*. Note the other L-M Arrester features, too . . . L-M Double Sealing at top and bottom that keeps destructive moisture out . . . the L-M Valve Material that undergoes *no chemical changes* in operation and therefore retains its efficiency indefinitely . . . the L-M Indicating Isolator that protects you positively against the possibility of a grounded circuit.

Ask your L-M representative about these features, you'll be convinced you want L-M Arresters protecting your lines . . . L-M offices at Oakland, Portland, Los Angeles, Spokane, Seattle, Phoenix and Denver.



LINE MATERIAL CO.

Save 50%
WITH
BLACKBURN
"GRIPITS"
BLACKBURN GRIPITS are the only service entrance connectors made completely of Duronze, and circular in form to give the utmost in strength with the least bulk. Gripits cost less than half as much as split bolt connectors and do the same job at the house service entrance. Save by using them!
JASPER-BLACKBURN
PRODUCTS CORP.
Main & Clinton Sts. ST. LOUIS, MO.

404:
AND NOW coming to catalogs, we turn to the most impressive of the month. It's put out by Royal Electric Mfg. Co., and it covers 122 pages. A partial list of the subjects includes: fuse links, distribution cutouts, bus-bar clamps, switch and bus insulators, outdoor disconnecting switches, air-brake switches, indoor bus supports and line hardware. For your reference file, bulletin No. 404 is valuable.

405:
SECOND CATALOG is published by BullDog Electric Products. Listed are safety switches, service equipment, switch boards, lighting and power panelboards and bus distribution systems. A special insert describes the new rocker-type panelboard. Its advantages to the installer are low maintenance expense, circuit identification, ease and economy of installing and ease of operation. Ask for 405.

406:
THERE IS less detailed information in the last catalog, but it's no less valuable to the buyer. Published by Delta-Star Electric Co., it covers indoor disconnecting switches and fuse mountings. Check coupon No. 406.

407:
"THE 100-WATT Cooper Hewitt Fluorescent Lamp" is an 8-page bulletin discussing the characteristics of this new lamp for general industrial lighting. Issued by General Electric Vapor Lamp Co., it contains descriptions of the following features: high light output, high efficiency, long life, cool blue-white light, no dark shadows, no eye fatigue, low installation cost, rectified d.c. arc circuit and dust-tight auxiliary equipment. Also included in the bulletin is a photometric rating chart, as well as a foot-candle table and complete specifications. Send the coupon to ELECTRICAL WEST and ask for 407.

408:
A 4-PAGE leaflet issued by Weston Electrical Instrument Corp. describes Photronic cells for industrial and experimental applications. Features of these photoelectric cells, such as high current output, permanence, instantaneous response and spectral sensitivity, are described in detail. Graphs show the effect of various values of external resistance on current output, as well as the variation of internal resistance of the Photronic cell under different conditions of illumination and external resistance. Write for No. 408.

LETTERS

Untruthful, Biased

DEAR SIRS:

I am not interested in renewal of ELECTRICAL WEST. Your anti-labor policy is too much for any honest workingman to swallow. The editorials have been untruthful and biased. It is very evident that the power companies are calling the tune.

LYLE GRIFFITH,
Los Angeles.

Motor Problem

DEAR SIRS:

. . . I also have a motor problem I hope you can help me with.

The trouble is light flicker caused by a 100-hp. slip-ring hoist motor, 440-volt. The flicker is not present while the cage goes up empty, but coming down loaded against power. The motor is driven above synchronous speed and causes a single-phase wattmeter to run backwards. Also a flickering of lights. The weight loaded is 5,000 lb. Rope speed 30 ft. per min. Distance 650 ft.

What voltage and kw. d.c. generator would this matter require for dynamic braking? And what harm if any will this unsteady current have on other motors that carry a steady load?

J. F. ROBINSON,
Spanish Mines,
Washington, Calif.

Can any reader give Mr. Robinson an answer?—Ed.

Unqualified Approval

DEAR SIRS:

Will you please check up and see if you have sent me my March copy of ELECTRICAL WEST. I miss my copy very much.

I am just a fairly new subscriber, but I sure like the magazine.

I am a student of E.E. at school, and while at school I work for a company that makes telephone equipment and during the summer I work, as a linesman, for a power company (construction crew).

I sure liked that article on condensers for power-factor correction in your magazine a few months ago and I wish you would have more like it.

JIM NEWMAN,
Lynden, Wash.

Red Face

DEAR SIRS:

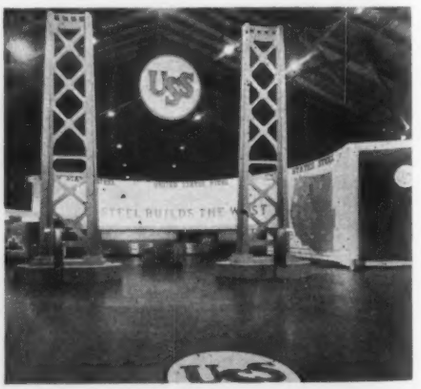
Contrary to all belief, Columbia Steel Co. is actually a subsidiary of United States Steel Corp. and not as suggested by your valued publication, a minion of competitive interests.

I am enclosing a general view (see cut) of the United States Steel Corp. exhibit on Treasure Island, with which group Columbia Steel Co. is included.

If you can manage to give us some sort of a correction in order that we can still receive our mail at the Russ Bldg., it will be greatly appreciated.

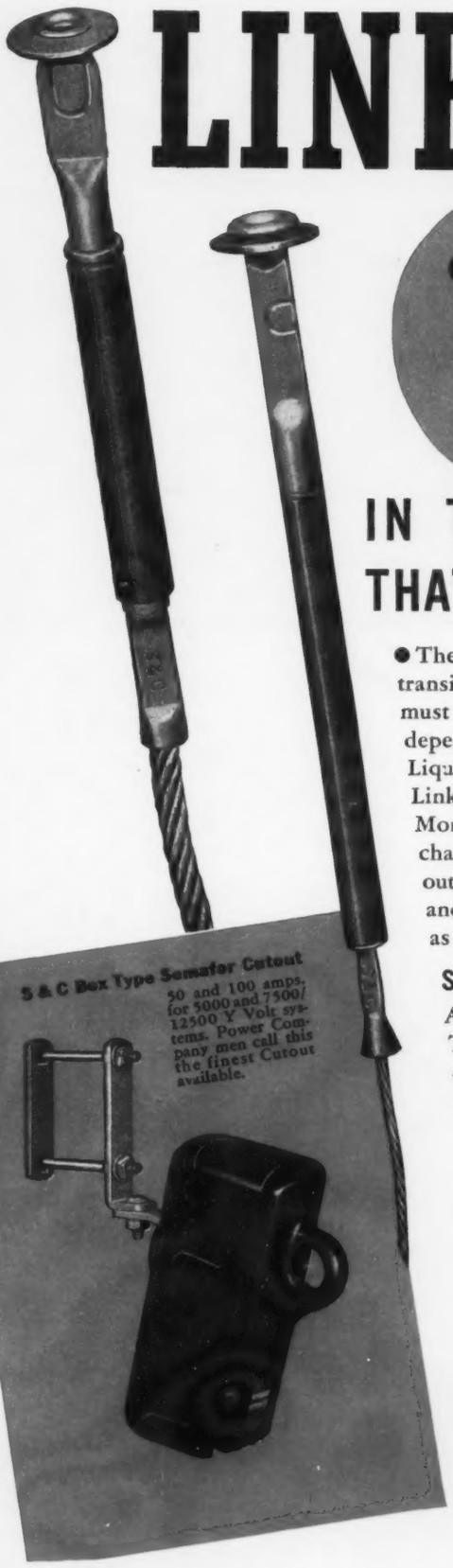
CHARLES W. HUSE,
Director of Public Relations,
Columbia Steel Co.,
San Francisco

To Columbia Steel and Bethlehem Steel ELECTRICAL WEST makes its apologies for an unfortunate error. Columbia Steel is not, as was said in the



World's Fair insert last month, a division of Bethlehem. Actually it was the Bethlehem exhibit which was pictured. And as Bethlehem has pointed out, their exhibit is not in a non-existent Transportation Bldg. but in the Vactionland Bldg.

IT IS THE LINK



S & C Box Type Semafor Cutout
50 and 100 amps. for 5000 and 7500/12500 Y Volt systems. Power Company men call this the finest Cutout available.

S & C Open Type Semafor Cutouts Cap.—50 and 100 amps. to 23,000 volts—heavy duty to 46,000 volts. Circuit interrupting process is completed inside the tube before upper contact is disengaged. Made also in 2- and 3-Shot Reclosures.

IN THE CUTOUT (ANY CUTOUT) THAT MAKES A BIG DIFFERENCE

● The link has a serious duty to perform—it must not be affected by transient currents—its characteristics must remain unchanged—it must not deteriorate . . . The protection that your Cutouts provide depends much upon the fuse links you use . . . Patterned after S & C Liquid Fuses in the design of the fusible element—S & C Silver Fuse Links remain constant in operating characteristics and accuracy. Momentary or transient overloads do not affect their coordination characteristics. They resist deterioration—prevent unnecessary outages and impairments of service. S & C Links are engineered and manufactured with the same degree of care and thoroughness as S & C Liquid Fuses.

S & C Links fit all Cutouts — They *Cut* Your Yearly Costs

A few hundred S & C Fuse Links mean but a small expenditure. They are the cheapest thing you buy—yet the heart of the Cutout. Why not order S & C Links and prove to yourself that they reduce servicing costs on *your* distribution lines?

SCHWEITZER & CONRAD, INC.

4435 Ravenswood Ave., Chicago, Ill.

Manufactured in Canada by Powerlite Devices Ltd., Toronto, Ont.

FUSE LINKS AND CUTOUTS

ELECTRA'S HUSBAND

Salmon Go For a Ride

"PUT that stuff away. It's six weeks until the opening of the trout season," Electra railed at me one night recently as I sat before a card table strewn with reels, flies, leader boxes and other fishing gear. "You've got a look on your face like a sick calf. One might think that you never expected to catch another fish."

"Maybe I won't—that is, big fish like those salmon I sent you from Oregon last year," I told her. "You remember I wrote you that Spen and I caught them in the Columbia. Well I read a piece in the paper the other day about what the government intends to do with the salmon up there and it disturbs me.

"You see when they finish the Grand Coulee Dam, it will be too high for the salmon to go over it with fish ladders. So they are going to make them go modern. They are going to teach the salmon to ride in automobiles—big trucks as a matter of fact. This story says the government has bought eight huge tank trucks, each of which will carry from 650 to 800 pounds of fish. They are equipped with a cooling system to regulate the water temperature. The water will be aerated. And each truck will carry 1,800 pounds of ice for temperature control."

"You're kidding me again," Electra interrupted. "Next thing I know you will be trying to make me believe that story about the Montana fur-bearing trout."

"If I'm kidding you, then the truck manufacturer who got the $59,000 order is in for an awful shock. The plan goes like this: They catch the fish which are bound for the headwaters of the Columbia above Grand Coulee in traps and haul them in trucks to the streams below the dam where they can spawn. The offspring from that generation will never know what an exciting time their parents had riding around the country in a truck. They'll just naturally assume that the new river has been their heriditary habitat.

"The new trucks have tanks that can be completely filled with water so that the salmon won't be bounced around. And while they are riding the water will be cooled down to within a couple of degrees of the temperature of the stream where they will be transplanted and liberated."

"What, do they expect them to catch cold?" Electra asked.

"Oh, no. That's so they will be acclimated. Otherwise they might turn around and go hunting for their home river. The driver can control the cooling apparatus and a thermometer on the dashboard tells him when it is just right."

Electra started laughing.

"What's so funny about this?" I asked heatedly.

"I was just wondering," Electra answered, "if they will call the man who drives the truck a midwife to the salmon."

JUST a few evening later Electra was emptying the ashtrays while I put away the cards and bridge table. She was in ill humor because her run of cards had been even worse than usual.

"Why do you insist on getting into political arguments every time Bill comes around here?" she demanded. "You know how it rankles me and it spoils the whole evening."

"Well," I replied, "it isn't every day that I have an opportunity to needle a New Dealer such as he is. Besides I'm just egotistical enough to think that I might convert him in time. You'll have to admit that he was backed up against the wall tonight. He'll be a conservative yet."

"What was all that stuff about history that you were quoting to him?"

"You should have listened closely," I answered. "I was trying to induce him to read Edward Gibbons' 'Decline and Fall of the Roman Empire.' You see Gibbon gave five reasons for the collapse of the great civilization that plunged the world into the chaos of the Dark Ages. If you remember your ancient history, you will recall that the Romans picked up the jig-saw puzzle left by Alexander the Great and built an empire. It was the first time the world had had unity based on law and not merely on force. Wherever the Roman legions went, they built roads and they set up courts. Then the whole thing collapsed."

"I remember that much," Electra said. "But why did it fall?"

"Gibbon read from the record five causes. First, the rapid increase in divorce; the undermining of the dignity and sanctity of the home, which is the basis of human society. Second, because taxes went higher and higher and public money was wastefully spent for bread and circuses. Third, the mad craze for pleasure, sport becoming every year more exciting and more brutal. Fourth, the building of gigantic armaments when the real enemy was within, in the decadence of the people themselves. And finally, the decay of religion, faith fading into a mere form—losing touch with life and becoming impotent to guide it."

"Stop," Electra said. "You sound like you were picturing an unretouched photograph of much of the things we see every day in the newspapers."

"Wait a moment," I remonstrated. "There is one more historical picture I want to paint for you. You probably never heard of Charles Austin Beard, the historian, but he stated the proposition in even simpler terms. I intend to pass this along to Bill the next time he comes over.

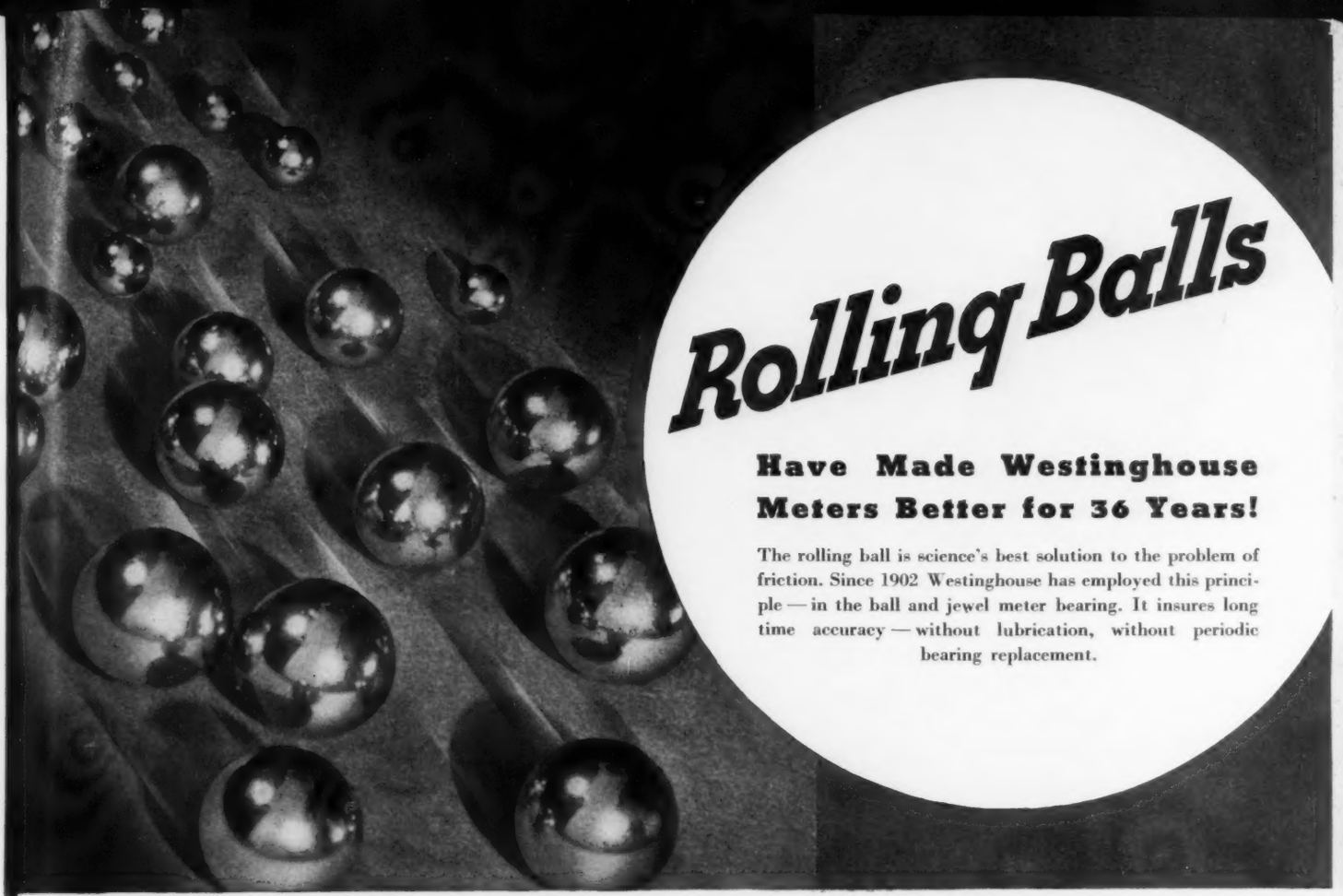
"Someone asked Beard to state the lessons of history in the fewest possible words. He did it finally in four sentences. Here are his admonitions to society: Whom the gods would destroy, they first make mad. The mills of the gods grind slowly, but they grind exceedingly fine. The bee always fertilizes the flower it robs. And lastly, when darkness grows sufficiently intense, one can always see the stars."

"I get it," Electra said. "The dictators, the attacks on your public utilities, hope for the future. . . ."

THE other day when Electra was complaining about a salesman who had annoyed her with his flights of imagination, I told her about a statement recently made by a commentator. He said, "Salesmen are prolific if not profound."

"You see may dear," I said, "a salesman can't make the grade unless he is prolific—at least in the generation of new ideas. Take the case of the enterprising rural electrification salesman. He sold two milking machines to a farmer who had only one cow. Then he turned around and took the cow in as the down payment on the machines."

"He wasn't a salesman," Electra parried. "He was a genius."



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Have Made Westinghouse Meters Better for 36 Years!

The rolling ball is science's best solution to the problem of friction. Since 1902 Westinghouse has employed this principle — in the ball and jewel meter bearing. It insures long time accuracy — without lubrication, without periodic bearing replacement.

LONG TIME METER ACCURACY CUTS DOWN METER EXPENSE

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This is the bearing that for 36 years has eliminated the need for lubrication and periodic bearing replacement. It saves money every year the meter is in service. No other bearing is so dependable — so free from friction and wear.

The meter records of leading power companies everywhere will prove to you the two great savings made by Westinghouse Meters —

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Send for the new Westinghouse Meter Book. It tells you all about Long Time Accuracy, and contains a chart that is a quick, sure guide to selecting the right meter to suit every condition. Address Westinghouse, E. Pittsburgh, Pa. Dept. 7-N.

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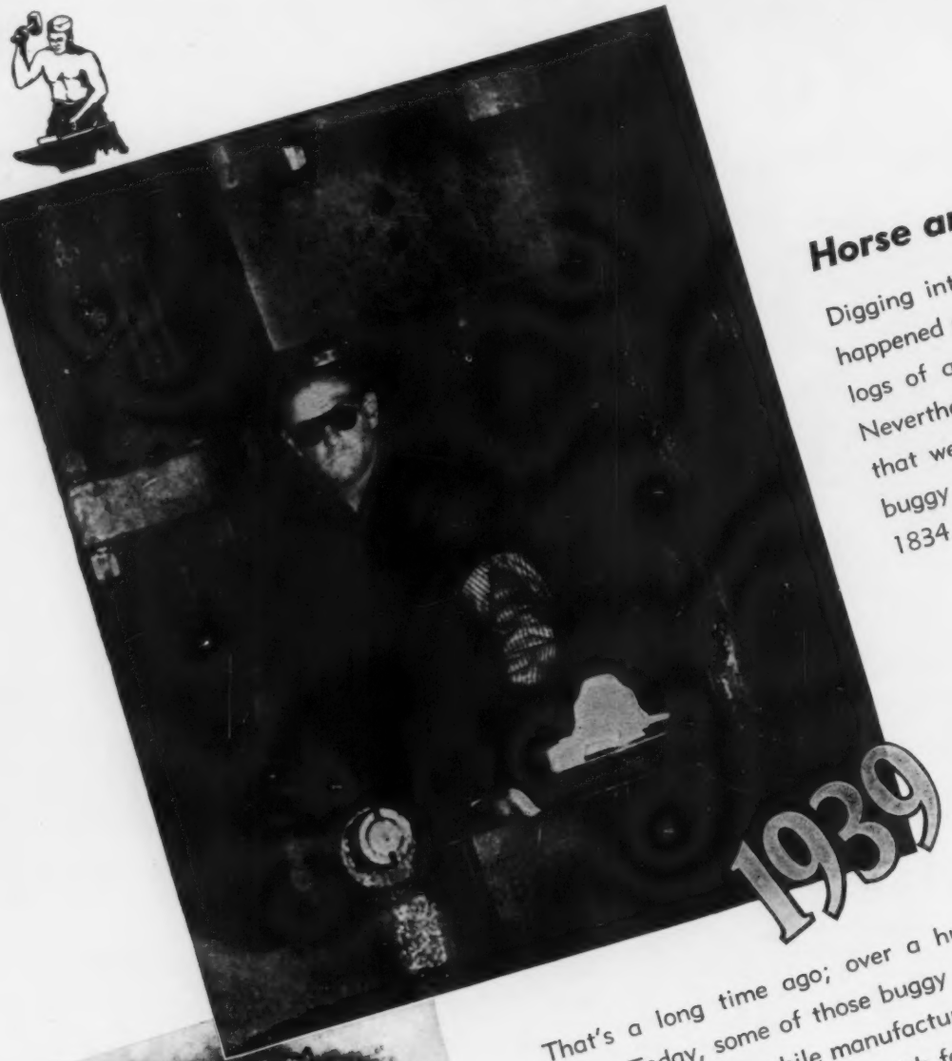
Westinghouse *Long Time* Meters



Horse and Buggy Days

Digging into the old files, we happened upon some old catalogs of questionable vintage. Nevertheless, the dates proved that we were selling foremost buggy manufacturers back in 1834.

That's a long time ago; over a hundred years. Today, some of those buggy makers are leading automobile manufacturers, and BTC is still supplying them with forgings.

Which all brings up the fact that BTC has been supplying the electrical transmission field with drop forged hi-line hardware for a good many years, and we hope that our trade mark means as much to utility and insulator men as it does to the automotive field.

The Brewer-Titchener Corporation
Cortland, New York

BTC *THROUGH YOUR INSULATOR MANUFACTURER ONLY*

G-E Current Transformers

Filled with Noninflammable Nonexplosive

PYRANOL

(23,000 to 161,000 volts)

THESE G-E porcelain shell-type current transformers, for outdoor service, are obtainable Pyranol filled*, and this means added safety. For Pyranol is a G-E noninflammable insulating liquid that is chemically stable. It has high dielectric strength, and it will not sludge.

Here are some other benefits you get with this transformer line:

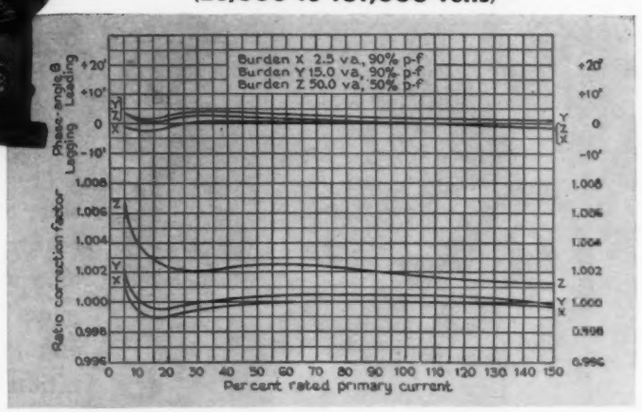
HIGH ACCURACY—Accuracy well within the highest NEMA classification. Study the excellent characteristics shown on the curves, and remember that such accuracy throughout the normal current range and under overcurrent conditions allows for either metering or relay applications.

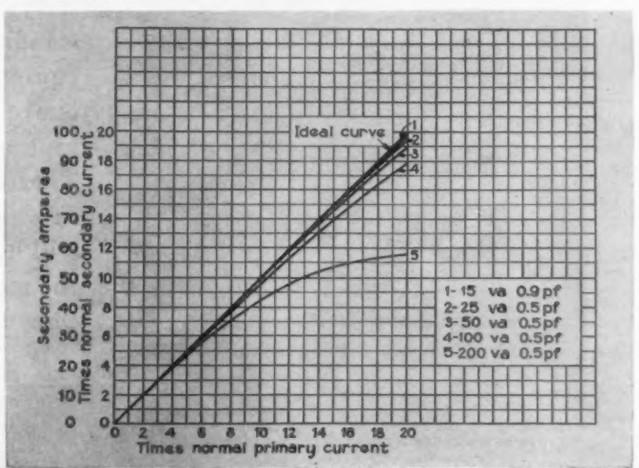
SMALL SIZE—On the 69-kv transformer, the overall height of the superseded design was 117 inches; this new design is only 42 inches high. And the new weight is less than half the former weight. You can readily realize what this means to you in reduced installation expense.

THYRITE BY-PASS PROTECTOR—A Thyrite by-pass protector, inside the transformer, provides protection from surges. It requires no servicing.

We shall be glad to supply additional information on these transformers. Address the nearest G-E office or General Electric Company, Schenectady, New York.

**Also available oil-filled*





Performance curves of the Type KF-326, 69 kv. Curves for transformers of other voltages are similar

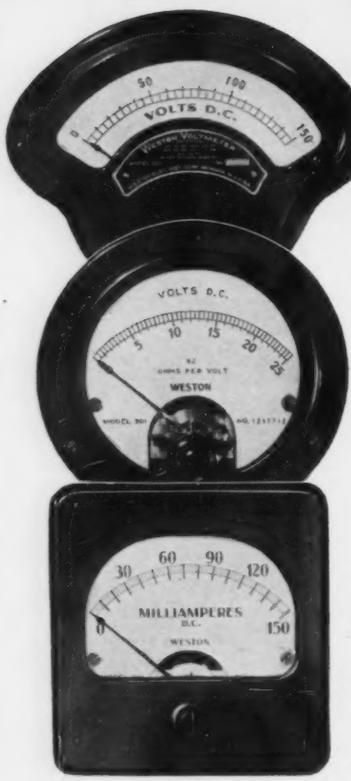
GENERAL ELECTRIC

420-54

WHEN BUYERS MAKE EXACTING

point by point

COMPARISONS



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it pays to have WESTONS *on the panel*

When the man who's in the market for your equipment begins a point-by-point check-up, isn't it natural that he start at the indicators and controls? And isn't it equally natural that he rate the invisible, internal qualities by the external evidence of foresight and good judgment on the panel? » » » Throughout industry today, the name WESTON on an electrical instrument brings a quick gleam of recognition from keen-minded buyers. It backs up your "quality story" right from the start. » » » In service, too, a WESTON standing guard at the control point helps to protect your equipment from inexact operation. Frequently, it is the one connecting link between your customer and your reputation for building a safe, dependable machine. » » » There's a WESTON Instrument for practically every "built-in" need. The WESTON representative in your locality will be glad to aid you in choosing the model that can do the most for you. Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

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A. A. Barbera,
Subway Terminal Bldg.
Los Angeles, Calif.

What Is the *Electrical Industry?*

FOR countless centuries, nightfall marked the cessation of human activities, to be resumed only with the coming of dawn. Our remote ancestors literally went to bed with the chickens, for the very obvious reason that the light from the moon—and at times only the faint glow of the stars—was inadequate for their normal pursuits of hunting, fishing and warfare. The beginning of civilization is marked by the advent of artificial light, and its evolution is shown by distinct mileposts—the pine-knot torch, the olive-oil lamp, the candle, the gas tip, the electric arc and the incandescent lamp.

All of this is so familiar to us that we dismiss it as a commonplace—and thereby we ignore the fundamental contribution which the electrical industry has made to humanity. At nightfall on the Pacific Coast America has been in darkness for several hours—so far as natural light is concerned; but America's varied activities continue at the same pace which prevailed during the daylight hours. Millions of our people are awake and alert, concerning themselves with innumerable duties and diversions. Millions are at work, providing tomorrow's food, getting out tomorrow's newspapers, preparing stores for tomorrow's trade, as well as continuing the daytime work of mine and factory.

Other millions of our people are being entertained. Still other millions—both adults and youngsters—are at their studies. Even the unfortunate are not neglected, but are receiving careful attention in hospitals and asylums that dot this great land. What is it that has thus changed the habits of the civilized world? *It is the electrical industry.*

We can make such a statement and yet give full credit to those other industries—agriculture, transportation, manufacturing, banking, insurance and the like, all of which play a part in the complex modern scheme. Without detracting from them, we can truthfully say that it is electricity that has brought about this change. Ours is the basic industry on which modern life depends.

Almost everyone is familiar with the appearance of New York at night. Most of you have seen it, and those who have not can make vivid mental images based on pictures you have seen and articles you have read. It is at night that the drama of New York seems most intense, as its countless lights give evidence of the varied lives of its people. Indeed, light seems symbolic of New York and we in the electrical industry, as well as the layman, may give no further thought to the part that electricity plays in this great modern metropolis. Actually, light is only one portion of the contribution our industry has made to this or any other great city.

New York means skyscrapers and skyscrapers would be impossible without electricity. The very steel of which they are made is dependent upon our industry for its economical production and efficient erection. The problem of vertical transportation could not be managed without electric elevators. Heating, ventilation, communication—all require the products of our business. Likewise, the horizontal transportation by elevated, surface-car and subway have their genesis in the electric motor.

When we consider the area of Manhattan Island, it is reasonable to state that it could not sustain a population of more than 200,000 without the aid of electricity. The buildings could be only a few stories high either for commercial or residential purposes. Distances which men could travel from home to work would be greatly limited, and the problem of food supply in such a city would tax the ingenuity of its people if they did not have electricity at their constant call. The same is true of Chicago, San Francisco, Los Angeles or any other modern American city.

As we go about our daily routine in our various jobs, we accept these wonders as Dr. Little says a "fish accepts the ocean." We tacitly assume that it has always been this way, whereas a moment's serious thought is all that is needed to recall what had to be done before this present state could be a reality. Is it not time for us to pause and make an appraisal of this great industry of which each of us is a part?

DIRECT your attention to this question: What is the electrical industry? Is it something in Schenectady, or New York City or Pittsburgh? Is it something that can be measured in dollars, or kilowatts or miles of copper wire? No, it is something more than any or all of these. It is a complicated affair of men, money and machinery, working together so harmoniously that men, women and children can live their lives more comfortably and do their work more easily than ever before.

For convenience in considering the composition of our industry, we commonly divide it into five groups—manufacturers, wholesalers, contractors, dealers and utilities. The order in which we name them is unimportant, for each is dependent upon the other and the operations of any branch are immediately disturbed when there is any difficulty experienced by one of the other branches.

It is the manufacturer who gathers raw materials from the four corners of the earth and combines them into devices which enable us to generate, transmit and consume this mystic power. He takes rubber from Malaysia, copper from Arizona, iron from Sweden, nickel from Canada, tin from Bolivia, aluminum from Tennessee, tungsten from Colorado, silk from China, asbestos from Texas, lead from Missouri, and, by intricate, patient and skillful process, he turns out wire, cable, switches, sockets, fuses and lamps with which the other branches of the industry carry on their business.

The normal outlet for the manufacturer is the electrical wholesaler who locates his warehouses at strategic points and stocks them with thousands of items so that the utility, the contractor and the dealer may have any item in any desired quantity at a moment's notice. It is the wholesaler who invests thousands and thousands of dollars in stock so that there may be no delay between the desire of a customer and its fulfillment.

However, the devices produced by the manufacturer and kept in ready access on the shelves of the wholesaler would be of no use to the ultimate consumer without the services of the contractor and the dealer. These two men are the

front line of attack. It is they who meet the customer, who analyze his problem, recommend equipment and persuade him to buy it. They are a vital link in the chain of distribution, for without them the other branches either would be stymied or would have to endeavor in some clumsy fashion to fill the place of the contractor and dealer. The contractor and the dealer are men of great action. Business seldom flows to them—they must get out on the street and promote it. The degree to which they are successful measures the prosperity of the entire industry.

Whether the utilities should be placed at the head or the foot of the list is a matter for argument which recalls the ancient jest about the hen and the egg. Without the electric energy which the utilities supply, there would be no outlet for apparatus and appliances. Likewise, if there were no apparatus or appliances to consume the electricity, there would be no need of agencies to generate it. Because of their bulk, the utilities loom large in any industry picture; yet theirs is but a portion of a whole picture essential to the comfort and happiness of mankind through the application of this agency which was suspected by Thales, was recognized by Franklin, was identified by Farraday and was harnessed for practical use by Edison and others of his generation.

THUS we make a convenient division of the electrical industry into five groups but we are still dealing with large units, each of which is so far-flung in its activities that we cannot readily appraise it. So let us go a step farther and break each of these units into its component part; then we make the interesting discovery that such an individual part is you. Without you, whoever you are, the industry in your particular area would be incomplete.

In any discussion of this subject we inevitably mention those great men of a few years ago who gave this business its start and nursed it through infancy and adolescence—Edison, Stanley, Westinghouse, Brush, Sprague, Steinmetz and others of like caliber. We give them our homage; we reverence their names; we would not for a moment deny them great praise. But when we speak of 1939, someone else is the electrical industry and that someone is *you*.

As you sit at home you are surrounded by evidences of electricity at work, while within a mile we could find hundreds of other applications of this modern service. We admit that Edison and those other great men of an earlier day gave this industry its start, and produced something for which your city is duly grateful; but at the same time we agree that they did not do anything *in* your city. If lights are burning and motors humming in your community tonight, it is because *you* did it!

If lights are burning and motors humming, it is because you, an electrical contractor, sat up at night studying the plans for the buildings. It was you who offered your skill and resources to put in the essential equipment. It was your men—Jack and Jim and Pete—who worked with hickey, Stilson, screwdriver and pliers to install the conduits, cables and switches.

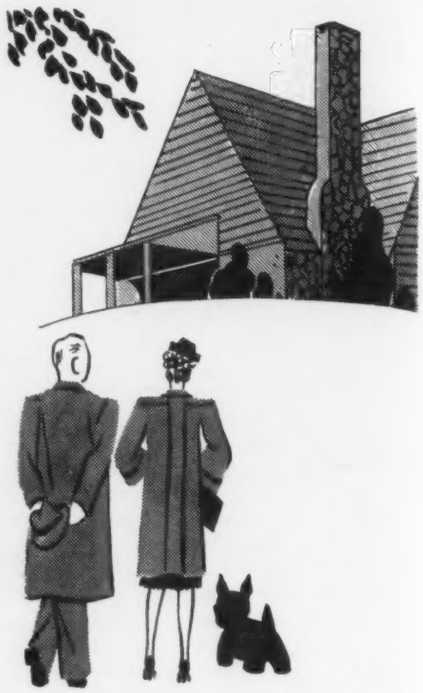
You may say, "Of course they did it, but what of it?"

It would not have been done without those trained hands, and hence in that respect they are the electrical industry. Neither could they have had their jobs without you as a director, with a mind trained to make estimates, experience to supervise them and sufficient capital to finance the undertaking. All of the resources of the electrical industry would have been of no avail without you and your men, Jack, Jim and Pete, to do the physical work of the electrical installations.

The electrical industry is you—the dealer—who have set up your shop and provided a stock of fixtures, appliances and accessories convenient for public inspection and purchase. You are as essential a part in this chain of distribution as is the druggist, the grocer and the baker. Without you, the electrical industry would have difficulty in disposing of its products, but more to the point, the customer would have difficulty in finding and appraising them.

The electrical industry is you—the wholesaler—who have simplified purchasing by gathering into a single warehouse the products of many manufacturers; who, by carrying the stock for the customers, save them costs of handling, depreciation, obsolescence, idle investment, floor space, insurance, taxes, cartage and theft; who furnish the right materials in the right quantity at the right time; who meet emergency demands for extra stock or for return of over stock; who reduce the contractor's estimating costs by furnishing up-to-date quotations; who carry credit responsibility; who furnish data, catalogs, advertising and sales promotional material, and who assist in developing markets for new products. Without you there would be a great gap in this chain of distribution.

The electrical industry is you—the manufacturer—who have taken great risks to introduce new ideas; who have spent money generously in research to improve old products and develop new

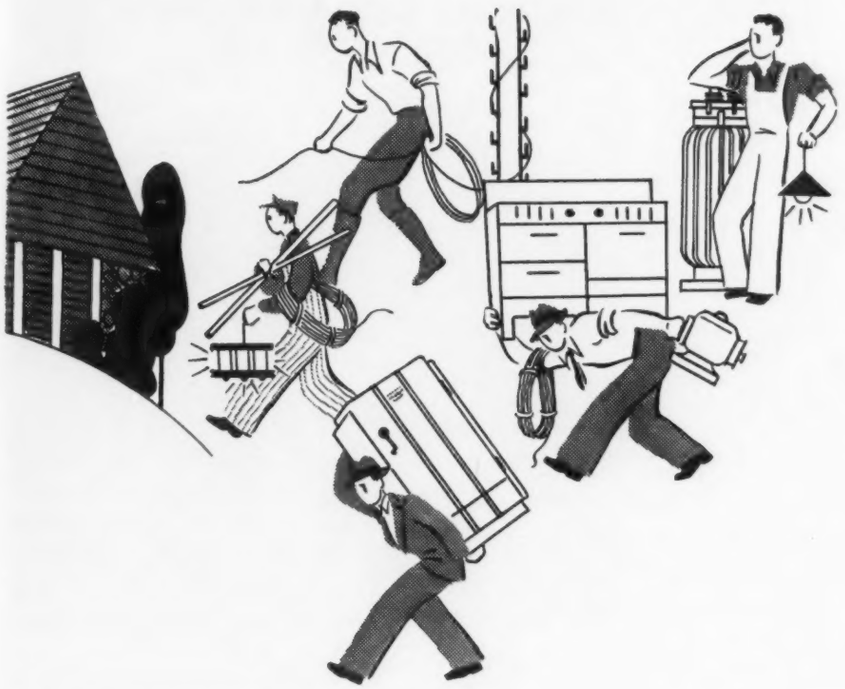


The customer is served by

ones. You must stand behind the wholesaler, anticipate his needs and be prepared to supply him.

The electrical industry is you—the utility operator—who have gone to the mountains and invested millions far in advance of the existing market so that electricity for light and power might always be available. It is you, the lineman, who with spurs and come-along have criss-crossed the country with copper arteries. It is you, the substation operator, who took off the charts and phoned the dispatcher just before coming home. It is you—and you—and you. Thousands, yes, millions of you are the electrical industry.

BUT it is more than all of these. Not only do you participate as technicians and artisans, but you are also in the picture as investors. From some place has come 12 billion dollars to provide the electrical generation, transmission and distribution for America. Did it come from Wall Street? Yes, in a measure, from men in an investment center. But most of it came from inconspicuous individuals. Much of it came from you and others in the industry. To the degree that we have bought the securities of utilities, manufacturers and wholesalers, we are direct investors in the industry. To the degree that we have insurance policies or savings accounts, we are indirect investors, for a large portion of such funds is ultimately employed to purchase electrical bonds and shares.



all the branches of the industry, either directly or indirectly.

Moreover, each of you who have your own business, whether it be as an individual, a partner or a stockholder, have invested heavily of your own resources to provide an essential link in this great chain. In the case of the utility, manufacturer and the wholesaler, these investments run into millions—in the case of dealers and contractors, they may be measured in thousands, but the effect is the same. Without them, the industry would be helpless.

And so you see the electrical industry is not something mythical—something intangible—but a reality so close to you that you can see and touch it. The electrical industry, truly, is *you*.

ASK yourself this very personal question: What led you to select this business for your life work? Was it not that you considered it a good business, offering opportunity for your particular talent, the prospect of making a satisfactory living and a sense of your ability to be of some service to your neighbor? There may have been times when you have been discouraged and tempted to doubt some of the points just mentioned. But as you look back to the day when you started in the business and as you look forward to its future prospects, do you not find yourself responding favorably to those questions?

Let us recall for a moment that this industry is only 60 years old. Let us remind ourselves that it did not hit its stride until 1900—about 38 years ago. Let us remember that its greatest impetus came after the World War—about 1920—only 18 years ago. Let us have in mind that many of the devices and applications of an electrical nature now being sold every day are very young.

Indeed, many of these have had their development, or at least their public acceptance, since that gloomy day in October 1929 which marked the beginning of our depression. We merely need mention air conditioning, the electric eye, the sodium-vapor lamp, the mercury-incandescent lamp, the fluorescent lamp, the electric shaver, the self-tuning radio, the high-speed electric welder and the electric clock. All these and others have come to the front since that day over nine years ago which seemed at the moment to spell our doom.

There is only one reason for this, and that is that this industry is so virile, so essential to civilization that not even the greatest economic disturbance in our history could halt its progress.

Truly, ours is a business with endless opportunity. More than that, it is one of responsibility and obligation to society. Many factors have been at work for many years to raise the hope of our people for a better scale of living, a release from physical drudgery, an escape from mental lethargy, an opportunity for leisure and the facilities to enjoy it.

The steam engine was the first medium to contribute to this. It was augmented by the products of Yankee ingenuity—the harvester, the sewing machine, the cotton gin, the internal-combustion engine and the pneumatic tire.

Men and women had hoped for and dreamed of such things, and mankind still hopes for more devices leading to human comfort and happiness.

Without question these new devices will be electrical. Not only is it our obligation to develop new things, but it is our primary responsibility to make those now in existence available to a greater number of people. We all know of the myriad of homes, stores, schools, shops, offices, hotels and hospitals that need better lighting, better machinery, better ventilation, better food preservation. If no new devices were introduced for the next ten years, there still would be abundant work for our industry if only a fraction of the needs of people are to be fulfilled.

IT may appear that we have discussed the complete chain of distribution from the manufacturer to the customer. But as yet we have not mentioned a considerable number of men whose immediate capacity is that of advisors to the customer; whose intimate knowledge of certain specialized electrical applications is so important that they in a sense may be considered a part of our industry. Certainly without them, all of us at times would be at a disadvantage. We refer to the architect, the decorator, the consulting engineer, the inspector, the optometrist, the physician and the educator. This list is not complete, but it will serve to indicate the importance of our keeping in sympathetic touch with these specialists who can be of such material assistance to us.

Nor should we close this discussion without giving due recognition to the customer himself, for when the last word is said, he is the reason for our existence. His is the only money available for us in conducting our varied activities. Happily for us, there has never been a time in our history when we could not give the customer more than value received for his money. This is true today more than ever. In the normal conduct of our business throughout the chain of distribution, each of us is entitled to and should have a reasonable profit, but the customer is the one who profits most of all. It is our responsibility at all times so to conduct ourselves and our business that the customer will not be slighted—that he will never come to us and say, "Why didn't you tell me this before?"

In the whole scheme of things commercial there is nothing of more vital concern to all the people than the efficiency, cleanliness, economy and safety of the mystic service supplied by all of us jointly who constitute the electrical industry.

Protection for Series Street Lights

By K. L. Howe

CASHMERE, Wash., encountered a special protection problem when an extension to an existing series street lighting circuit was made and a booster transformer was added to furnish the kva. which the existing constant-current regulator could not supply. Expanding this old circuit increased total exposure. More important, however, was the increase in total circuit voltage, especially on the old lines. Lamp failures in large groups occurred. In this case the limits of current regulation were restricted by a constant-potential booster transformer.

Constant current for the lamp circuit is supplied by a constant-current regulator which receives its primary energy from a constant potential circuit. The growth of a series lighting circuit may exceed the rating of the constant-current regulator, in which case a larger regulator is installed or a booster transformer of fixed kva. output is added. A booster transformer represents a non-adjustable quantity of energy, and in case of lighting circuit faults the kva. requirements of that portion of the circuit remaining in circuit may be less than the operating range of the constant-current regulator. Whether or not a constant-current lighting circuit is equipped with a booster transformer, there are a number of conditions which result in excessive lamp current. Modest values of excessive current are most disastrous since lamp failure takes place at an accelerating rate. Each lamp failure reduces the voltage burden and, if current regulation has ceased for any cause, a greater lamp-circuit current is produced.

The constant-potential circuit which supplies energy to a constant-current regulator is always equipped with some form of over-current protection. This form of protection can function only on an increase in kva. demand, assuming a substantially constant voltage; whereas the great majority of faults in the street lighting circuit produce a decrease in kva. demand.

Control for street lighting circuits, located in the constant-potential primary service to the constant-current regulator, may be manually operated; magnetically operated, manually supervised; or magnetically operated,, time-switch controlled. Regardless of the type of control, the need for supervision of the value of lamp-circuit current is necessary. The protection recommended for installation in the lighting circuit must actuate the primary circuit control. In the case of manual control, and magnetic control manually supervised, the only important requirement is reliable relay protection.

The use of a time switch with magnetic control introduces certain complications. The time switch closes and opens a two-wire control circuit to the operating coil of a magnetic switch; with the magnetic-switch main contacts in the primary circuit to the constant-current regulator. Since the time-switch contact is closed throughout the period of darkness and is not affected by the operation of any protective device, it is necessary to arrange auxiliary relays in the operating-coil circuit of the magnetic switch to prevent reclosure of the magnetic switch. Fig. 1 (opposite page) shows such an arrangement, together with the proper location of over-current relay in the lamp circuit.

A low voltage control circuit (L_1-L_2) supplies energy to drive the time clock and energize the operating coils. Primary power supply to the constant-current regulator and booster transformer has been assumed at 2,200 volts controlled by a magnetically-operated oil switch. A current transformer is located in the constant-current street-lamp circuit, and its secondary contains an indicating ammeter and an induction type over-current relay. Assuming a 6.6-amp. lamp-circuit current, and a 10 to 5-amp. current transformer, the ammeter should have a 5-amp. element, and a 0- 10-amp. scale calibration. The 6.6-amp. point on the scale should be emphasized by red-line and red-number marking.

The choice of an induction type over-current relay, to provide an adjustable time delay of approximately 0.5 sec. at minimum tripping current, is absolutely essential, in order that tripping will not take place on transient conditions caused when the transformers are energized. A standard, induction-type over-current relay, having a range of 2 - 6 amp., should be set on the 3.5-amp. tap, and the vernier adjustment made to permit the relay to just trip at 3.35 amp. This corresponds to 6.7 amp. in the lamp circuit. The vernier adjustment on the relay will of course permit of a closer or wider adjustment to the 6.6 amp. operating-current value; and time adjustments should be a minimum, yet sufficiently long to prevent the most severe transformer-exciting transient from tripping the relay. The induction type over-current relay should be arranged with circuit opening contacts, as indicated in the accompanying wiring diagram.

Two auxiliary relays are used. No 2 relay has two "break" contacts connected in parallel. As an initial condition, assume control energy is available and the time switch contact is open. The operating coils of the oil switch and No. 2 relay are de-energized. No. 1 relay coil is energized through the back contacts of No. 2 relay, and the break contact of the induction over-current relay. The front contacts of No. 1 relay are therefore closed, one of which provides a sealing circuit around the contacts of No. 2 relay. No. 1 relay contact provides a circuit to the operating coil of the oil switch.

Now as soon as the time switch closes its contact, the oil switch closes and No. 2 relay closes. An over-current condition which causes the induction over-current relay to open its contact will cause No. 1 relay to drop out. This will open the oil switch, but No. 2 relay remains closed. The over-current condition is relieved and the induction over - current relay resets, closing its contact, but No. 1 relay does not reclose since No. 2 relay contacts are open.

With this set-up, manual supervision will reclose the oil switch by pressing the push button and then releasing it. If the over-current condition still exists, the induction type over-current relay will again open the oil switch. The oil switch cannot be held closed by holding the push button depressed. The opening of the time switch will also reset the system after an over-current operation. The toggle switch may be used to energize and close the oil switch for inspection and maintenance purposes.

This simple arrangement will therefore prevent holding the lamp circuit closed under an over-current, and reclosure is easily accomplished by manual supervision.

Previous lamp failures in large groups were reported, but since installation of the current relay and auxiliary devices no lamp failures have resulted from circuit faults. It is evident that there are many street lighting circuits where lamp failure in large groups could be stopped by accurate current supervision in the lamp circuit.

Fig. 1—Wiring and schematic diagrams for street lighting protection

Single-Phase Arc Welders

By A. C. Kelm
and
Corbett McLean

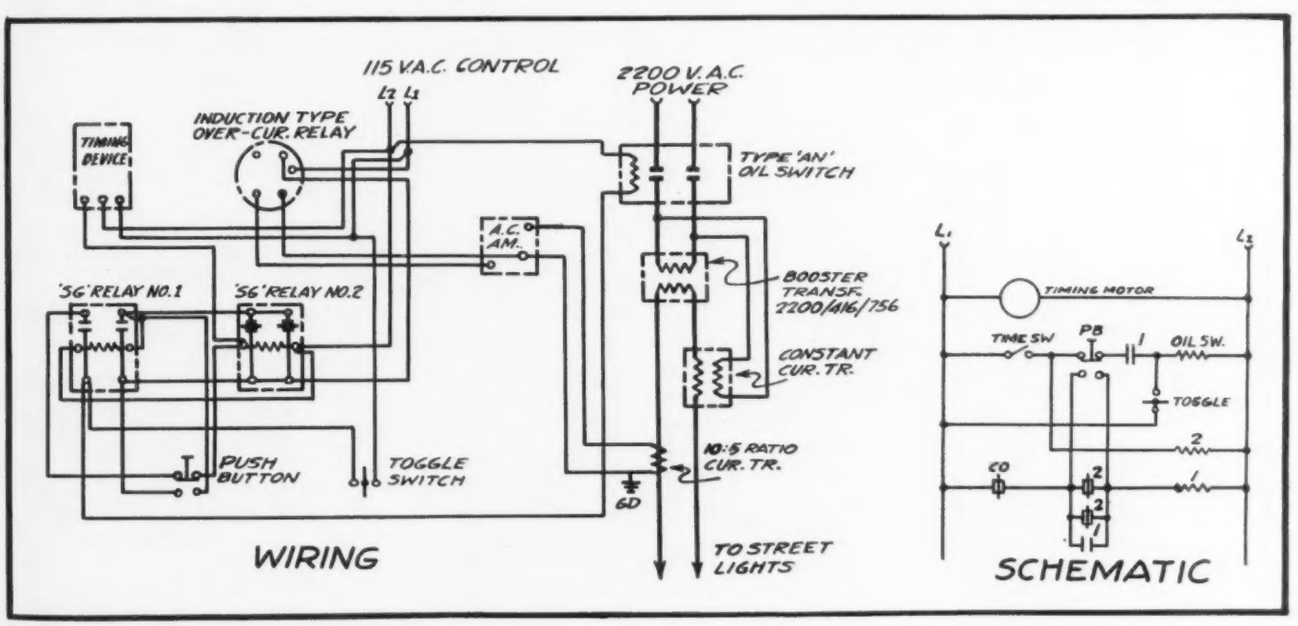
POPULARITY of the single-phase arc welder has increased to the point where its inherent characteristics — low monthly consumption, high surging demand, low power factor — present serious problems to the utility. Improvement of electrodes in recent years has permitted reduction of open-circuit or striking voltage and resulted in higher arc-voltage characteristic. But while these in turn have raised power factor and reduced demand, power factor in most welders is still only 50 to 55% with units operating at rated voltage.

The NEMA standard open-circuit-secondary rating is 80 volts, and standard load- or arc-rating is 30 volts for 150-amp., ½-hr. welders and 40 volts for 300- to 1,000-amp., 1-hr. welders.

In the past, paradoxically, welders of inferior design have had a higher power factor than machines of better quality. This was attributable to high resistance of windings and leads and the use of resistance instead of reactance control with consequent loss in efficiency. The short-circuit ratio, or ratio between short-circuit and welding currents, was high,and the surges resulting from contact of the electrodes or short circuiting of them by a globule of molten metal was much more severe than on machines with lower power factor but better short-circuit ratio. For the reduction of the secondary voltage, good practice dictated that the phase angle between voltage and current be kept at a maximum, in order to restrike the arc more easily when the current was passing through zero. Claims have been made that a nationally-advertised, low-priced welder can be attached to the ordinary house lighting circuit. This machine is merely an auto transformer without a complete iron core and draws about 85 amp. on the primary side. The short circuit ratio is extremely poor. Other inferior welders have similarly undesirable characteristics.

Recent test data on various arc welders and spot welders appear in Tables I and II.

The advent of special covered electrodes which shield the arc, exclude oxygen and nitrogen from the air, prevent too rapid cooling of the weld, and



maintain an ionized arc path has done much to allow the improvement of power factor, but it has also made the problem more acute by popularizing the a.c. welders.

Two large manufacturers are producing 500-amp., single-phase, 220/440-volt arc welders which operate at from 50 to 55% p.f. and draw about 22 kw. of real power and 33 rkva. to produce a 40-kva. demand from the line at rated capacity. Obviously, full correction would require 33 ckva. in capacitors. But while this would produce a 22-kva. (or 22-kw.) demand at full load, no-load demand would be 33-kva. leading.

A rule-of-thumb method for determining size of capacitors recommended for arc welders is to allow 4 kva. for each 100 amp. of welding current. A 500-amp. welder would therefore require 20 kva. of capacitors. At no load, the input would be 20 kva. at zero p.f. leading; at 200-amp. output, the input from the line would be 9 kw. of real power and 6 kva. of leading reactive power, or 11 kva. at 0.82 p.f. leading; and at 500 amp. (rated output), the input from the line would be 22 kw. of real power and 14 kva. of lagging reactive power, or 26 kva. at 0.84 p.f. lagging.

The application of capacitors would reduce the maximum demand of the machine but the voltage regulation due to this swinging type load would not be changed. The number of volts between no load and full load would remain unchanged, although the level of each would be raised by the corrective action of the capacitor. The short-circuit ratio affects the regulation far more seriously.

It might be possible to cut in the capacitor either in its entirety or in steps depending upon the load and to do this rapidly by means of a thermionic relay or similar device. However, at the present time the expense of this equipment would not be justified.

Reputable manufacturers undoubtedly will continue to improve power factor. One welder recently placed on the market operates at from 70 to 80%.

Nameplate rating has had little significance in the past. Kilowatts mean little when power factor may vary from 30 to 80%. Even kva. rating has little value because NEMA standards specify that ratings of small welders shall be based on ½-hr. continuous duty and those of large welders on 1 hr. of continuous duty. A welder rated at 100 amp. for ½ hr. can generally produce from 150 to 180 amp. intermittently.

Utilities might consider the benefits to be gained by these steps:

1. Investigate all makes of welders and secure their characteristics either through manufacturers or by test.

2. Compute the amount of capacitor kva. necessary to bring any machine to 80% p.f. The customer could then either install the necessary corrective capacitance and be billed on a present motor schedule, or he could be placed on a demand billing based on the maximum kva. demand of the welder.

3. Ask manufacturers to include maximum kva. as well as rated ½-hr. duty kva. on the nameplate and to exclude any but the lightest equipment, and perhaps all, from 120-volt service. The desirability of low short-circuit ratio and high power factor should constantly be stressed. A national organization such as the Edison Electric Institute might well be the medium for some such interchange of viewpoints.

4. Notify distributors of arc welders of the capacitor size required by the utility for acceptance of the machines under a motor schedule. Capacitors cost about $18 per kva. for these voltages.

It has been stated by a representative of one manufacturer that the installation of 2 kva. in capacitors at a cost of $36 on a 150-amp. welder costing $170 would raise the power factor to 80% at maximum load. Based on a monthly demand charge of $1 per kva. without capacitors, and on a regular motor schedule, at 80% p.f. or better, the customer would effect a saving in his power bill in an 8-month period, sufficient to pay him for his capacitor investment.

By requesting the manufacturer to place the necessary nameplate data on the machines and keeping him informed of the problems encountered and aims desired by the utility, by securing the cooperation of the distributor, and by establishing a definite, uniform policy and schedule fair to consumer and serving agency, it is believed the utilities can steer welder development into channels which will benefit all concerned.

NORTHWEST ASSOCIATION REPORT

This article on welders is one of the papers to be presented by the Utilization Committee (Walter Brenton, chairman) at the 1939 meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn. A. C. Kelm is with Utah Power & Light Co.; Corbett McLean, Northwestern Electric Co.

Table I—Single Phase Arc Welders

Unit No.	Name Plate Data	Secondary Current Setting	LINE No Load Volts	LINE Strke. Amps.	LINE Load Volts	LINE Load Amps.	Power Supply Source and Remarks
1	Unload 75 volts, load 35 volts. Primary line, 220 volts, 15 kva., 200 amp., 1 hr.	150 200	246 246	55 ..	232 226	56 70	Power bank 3—10-kva. Metered on power connection.
2	Primary 240 volts, 30 amp.; 480 volts, 15 amp., 60 cycles. Secondary 70 volts max. open circuit.	As found in use.	246	40	238	38	Power bank 3—15-kva. Metered on power connection.
3	Line voltage 220/110, 60 cycles, sec. amp.—to 240.	As found in use.	232	25	215	33	Power bank 3—7½-kva. Metered on power connection.
4	No name plate	As found	232	90	200	85	Power bank 3, 5-kva. Metered on power connection.
5	Line volts 220, 60 cycles, 60 to 240 amp.	As found	231	85	208	70	Units 4 & 5 on same bank. Calculated p.f. on No. 4—47%.
6	Line volts 220, 60 cycles, 60 to 240 amp.	As found	...	95	...	92	Power bank 3, 15-kva. Bank is for own use only. Metered on power connection.
7	No name plate	Low High	242 242	15 30	236 220	23 60	5-kva. transformer. Small motors on same transformer. All on power meter. Average power consumption over 6 mo. period: 79 kw.-hr.

Table II—Spot Welders

Unit No.	Name Plate Data	Secondary Current Setting	LINE No Load Volts	LINE Load Volts	LINE Load Amps.	Power Supply Source and Remarks
8	220 volts, 75 amp., 14-kva.	No. 2 No. 6	246 246	240 225	21 73	Separate transformer and meter, 10-kva.; from 2 to 14 kw.-hr./mon.
9	Primary volts 220, 60 cycles; capacity 7-ga. steel.	No. 2 No. 5	240 240	230 220	80 200	Power bank 3, 15-kva. Separate meter; 0 to 2 kw.-hr./mon.
10	220 volts, 6 kw.	No. 3 No. 6	244 244	237 222	26 70	15-kva. dist. transformer, non-residential district. Average power consumption over 6-mon. period—27 kw.-hr.
11	220 volts, 9 kw.	No. 3 No. 6 No. 8	246 246 246	242 240 234	10 31 72	15-kva. dist. transformer, residential district. Average consumption over 6-mon. period—19 kw.-hr.
12	220 volts, 60 cycles, 20 kw.	No. 4 No. 8	239 239	235 226	54 150	25-kva. dist. transformer, non-residential district. Average consumption over 4-mon. period—17½ kw.-hr.

Rebuilt Transformers Defy Old Age

By J. C. Scoville

UTILITIES are constantly being faced with the necessity for discarding a great deal of perfectly good equipment which has become obsolete. Street lighting equipment is no exception. When the incandescent unit had reached a satisfactory state of development, the magnetite arc, which theretofore had been supreme in this field, became unprofitable to operate.

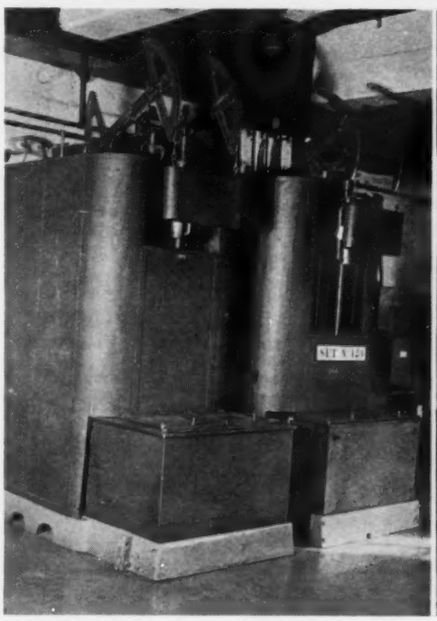
The Portland General Electric Company attempted to salvage some of its investment in magnetite-arc equipment by utilizing the constant-current transformers, which were a part of the apparatus, for 6.6-amp. incandescent use. Two frequencies, 33 and 60 cycles, were in use on this system, and at one time about one-half of the arc circuits were used on each system. The 60-cycle transformers were of two types, Type MS, which had coils of rectangular shape, and Type MSO, which had circular coils. Fig. 1 shows one of each type before changing.

No changes were made in the primary of the 60-cycle transformers, which is the movable coil in these sets, but a single secondary coil was designed to replace the four secondary coils in both types. This coil is circular in shape, 12⅜ in. inside diam., 19¾ in. outside diam., 3⅝ in. wide, and contains 672 turns of No. 9 D.C.C. magnet wire wound in 24 layers of 28 turns each. Cooling of the coil interior is effected by two ⅜-in. vertical air ducts formed by spacing maple dowels 3 in. apart throughout the circumference of the coil, between the 8th and 9th layers, and between the 16th and 17th layers. Two thicknesses of untreated cambric are laid around the outside turns of each layer and between layers in such a way as to lock all turns and make the coil self supporting. The winding is finished by dipping and baking three times. No outer insulation is used, the coil being mounted on treated hard wood clamps.

The reactances, which were mounted below the transformer, were removed and the transformer lowered to the floor, after which the casing was cut to fit. The dashpots on the sets were found unnecessary as there was very little overswing, the coil being nearly deadbeat. The circuits are cut in with the coils in the closed position. Fig. 2 shows a transformer after change, and Fig. 5 shows performance.

Ten of these sets have been in use since 1931, with only one case of trouble, caused by lightning, which burned off a terminal on the secondary coil without damaging the coil itself, making only minor repairs necessary.

The average cost of the new coils was $48.55 each, and the cost of labor and



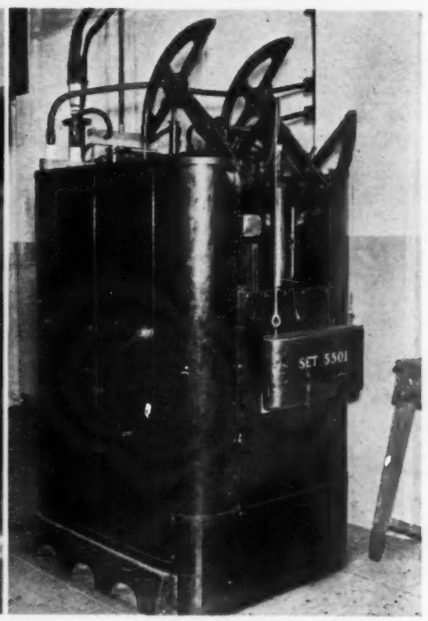
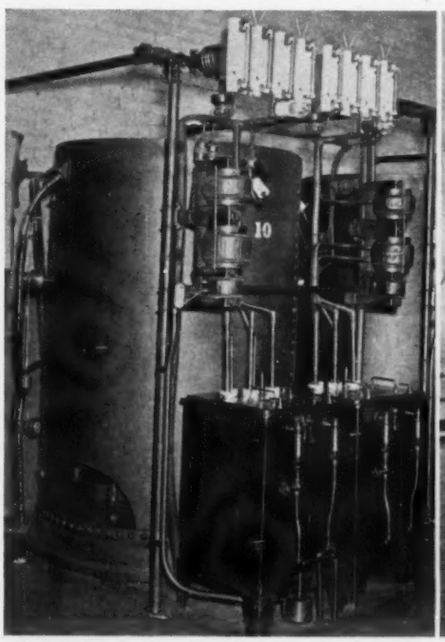
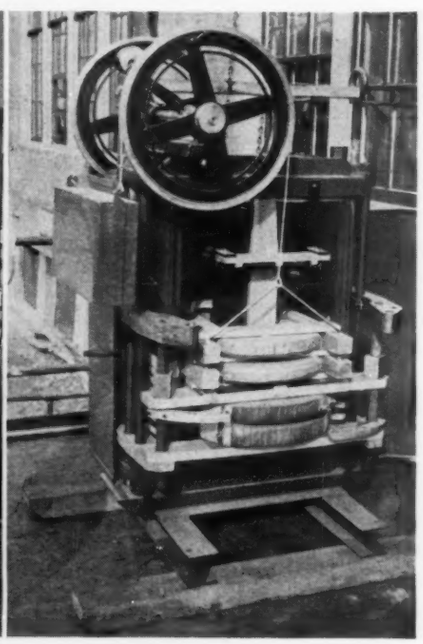


Fig. 1 (above left)—Types MS and MSO transformers before rebuilding. Fig. 2 (above right)—Same, after rebuilding. Fig. 3 (below left)—One of the 33-cycle sets before rebuilding. Fig. 4 (below right)—Rebuilt 33-cycle transformer with jacket removed showing winding and mounting





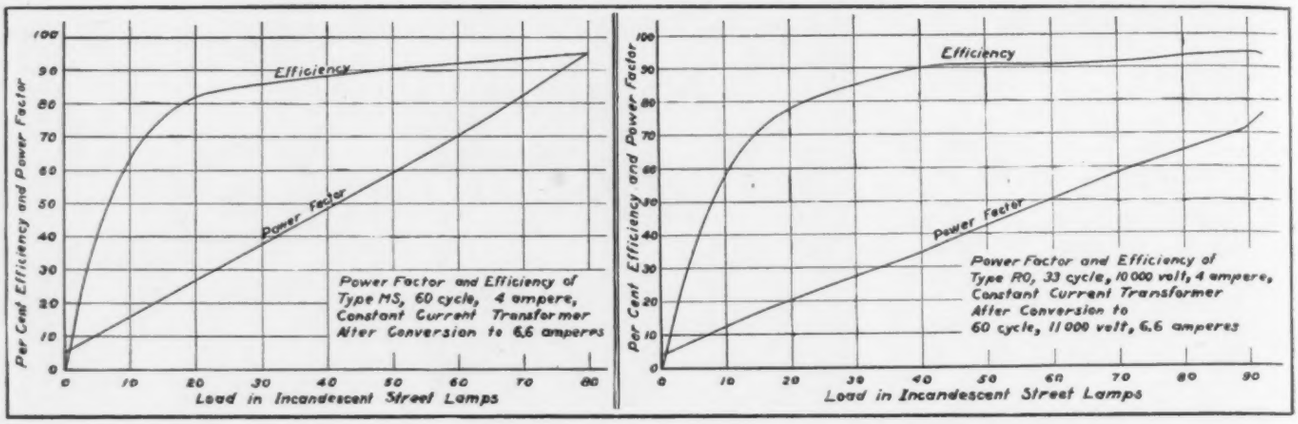

Per Cent Efficiency and Power Factor
Efficiency
Power Factor
Power Factor and Efficiency of Type MS, 60 cycle, 4 ampere, Constant Current Transformer After Conversion to 6.6 amperes
Load in Incandescent Street Lamps
Per Cent Efficiency and Power Factor
Efficiency
Power Factor
Power Factor and Efficiency of Type RO, 33 cycle, 10000 volt, 4 ampere, Constant Current Transformer After Conversion to 60 cycle, 11000 volt, 6.6 amperes
Load in Incandescent Street Lamps

Fig. 5 (left)—Performance of rebuilt 60-cycle transformer. Fig. 6 (Right)—Performance of rebuilt 33-cycle transformers

materials for converting the transformers, which was done in the field. was approximately $75, a total of $123.55 per set.

The 33-cycle transformers originally were oil cooled. To reduce fire hazard and make them more accessible for repairs they were changed to air-cooled many years ago. At about the same time they were changed to 60-cycle operation. This was completed about 15 years ago, and since that time they have operated as 60-cycle, air-cooled transformers. The secondary coils in this type are stationary and mounted in the center of the core with a movable primary coil on each side, being arranged so that the coils counter balance each other. The only counter weights are the trimmer weights. Fig. 3 shows 33-cycle sets before changing.

During experimental tests to determine the feasibility of changing to incandescent use, it was found, with the coils in their original arrangement, that the regulation was very poor its being possible to regulate through a range of only about six lamps. After several experiments it was found that with the primary fixed at the bottom of the core, the secondary movable and counterbalanced with a counterweight, regulation was excellent and the set functioned perfectly from a short circuit to over 90 lamps. As the quadrant arms and bearings with this arrangement were burdened with nearly twice the weight for which they were designed it was considered advisable to replace them. The wheels were fabricated by welding and the assembly mounted on sealed ball bearings. The counter weight is a 5x 12 x 25½-in. tank of ten-gage steel filled to the proper weight with scrap iron. Circular slots were provided in the wheels for trimmer weights. The heavy steel tank and cast iron base were replaced with a light steel jacket and structural base with a considerable reduction in weight and floor space requirements. New windings were designed.

An 11,000-volt primary consists of two coils of 1,000 turns each of No. 11 single cotton enamel magnet wire wound in 56 layers of 18 turns each. A tap is provided at the 900th turn on each coil. After impregnating, the coils are insulated with varnished cambric and mounted on treated hard wood. For the primary, 270 lb. of wire was required.

A 6.6-amp. secondary has two coils of 598 turns each of No. 9 D.C.C. magnet wire wound in 30 layers of 20 turns each. The two coils are clamped together, with ¾ in. space between them, in a hard wood cradle for suspension. Required for the secondary was 254 lb. of wire. All of these coils received the same treatment as to layer insulation and varnishing as that described for the 60-cycle coils.

During the experimental testing on the 33-cycle transformers it was noticed that the heavy cast iron T bars that serve to clamp the center leg of the core became quite hot. Replacement of these with maple resulted in a saving of about 300 watts in losses. No abnormal heating occurred on any other parts of the assembly.

Fig. 6 shows performance of the 33-cycle transformers. As will be noted, the efficiency compares favorably with that of the 60-cycle while the power factor is lower. It has been suggested that the quality of the core iron is perhaps responsible for this as the 33-cycle transformers were manufactured prior to the introduction of silicon iron while the 60-cycle are all of later date.

Fig. 4 shows the converted 33-cycle set with the jacket removed.

To date, only two of these sets have been rebuilt, the first of which has been in use about five years. Twenty still remain in use on magnetite circuits. As the work done on these two sets was of an experimental nature no accurate costs are available. They will, of course, be higher than that of the 60-cycle transformers.

GAS-FILLED CABLE, particularly for 10- to 35-kv. applications, has been announced by General Electric. Design is based upon what appears now to be the most economical working pressure—10 to 15 lb. per sq. in. At this pressure, voltage stress is lower than that of oil-filled cable but considerably higher than conventional solid types. Hence the new type requires less insulation than solid type, for a given conductor size. Thus larger capacities may be run in existing present ducts. Filling a gap between oil and solid types, it compares with the latter in cost. Present installations are confined to New York

Special Vehicles Augment Modern Fleet

By H. J. Martin

MOBILE equipment for those who work on the overhead systems of electric utilities may —as may vehicles used for other types of work—be divided into two classes. One consists of various types of standard "line" trucks for the accommodation of outside crews who engage in all-round construction and maintenance operations. The other consists of special pieces of equipment, built for the simplifying of one specific job.

Trucks used by the Los Angeles Bureau of Power & Light for normal overhead maintenance and installation are designed by the General Plant and Operating divisions for the latter's use and are constructed in the Bureau's shops.

Special-purpose units, however, may be constructed for the Bureau. An example is a piece of equipment put in service this year for the purpose of washing insulators on the lines. Designed by the Bureau, it was built by Crown Body Corp. and consists mainly of a Moreland cab-over-engine, 26,000-lb. truck chassis of 222-in. wheelbase, a Seagrave fire-fighting ladder especially adapted with crow's nest for hoseman, a Bean spray pump, a 900-gal. water tank, and cabinet space for tools and fire fighting equipment.

Cleaning line insulators was originally accomplished by hand wiping with a damp cloth. Later, it was found that by playing a needle stream of water on them, a satisfactory job could be done much more economically. This latter procedure has been followed for a number of years by the use of a truck equipped with a tank, telescoping hoist with platform (for elevating the hoseman to a height of 30 ft.) and a centrifugal pump developing about 350 lb. per sq. in. pressure.

The new machine will elevate the hoseman to 72 ft. if necessary, which height is sufficient for spraying insulators on most of the towers on the Boulder transmission line.

The spray pump, operated by a split-shaft power take-off, is capable of developing up to 1,000 lb. per sq. in. for delivering a forceful stream. The quantity of water delivered is rather small, being 37-gal. per min., as it was found more desirable to have high pressure than a large quantity of water to do a good job.

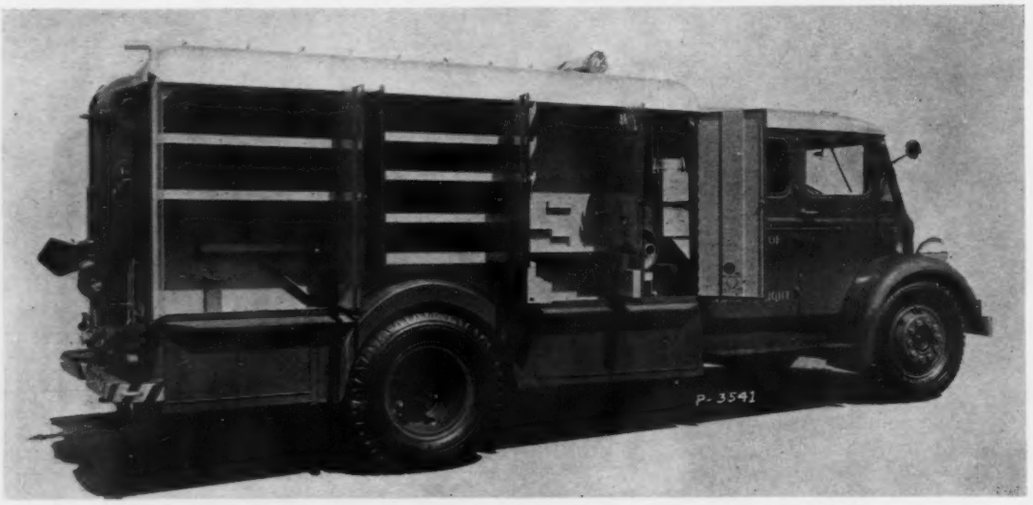
The ladder is mounted on a revolving platform, which will rotate in almost a complete circle. It may be extended to full length in a horizontal position or at any angle up to full vertical. All operations are by hydraulic control from a second pump, operated from the power take-off and developing 750-lb. per sq. in. pressure. The platform man has close control of all operations of the ladder: extending, raising, rotating, retracting, and lowering.

Washing usually is done at night (off peak) when the line can be de-energized without inconvenience to system operation. Tests have proved that an energized line may be washed without undue hazard to the hoseman if pure city water is used, but this procedure is followed only in special cases. The washing of energized lines will sometimes cause a flashover between phases due to the current carrying ability of the wetted dust deposit on insulators and crossarms.

The cycle of operation requires on the average, one minute to complete; that is, stop, set stabilizing jacks, elevate hoseman, spray insulators, retract hoseman, pull up jacks, move to the next pole.

Two extra reels, carrying 150 ft. of hose are mounted one on each side of the truck, so the

Insulator washing truck put into service this year by the Los Angeles Bureau. It operates at the rate of a pole per minute, carries 900 gal. of water, can be used in emergency for fighting fire



This light line truck is characteristic of other classes of regular equipment designed and built by the Los Angeles Bureau. The body can be constructed by any sheet metal shop equipped with a press brake, welding apparatus, drill press, and a nominal assortment of sheet metal working tools. If chassis is damaged or worn out, the body can be transferred to another. Use of Cor-ten steel, except flooring, combines strength and light weight. Cross beams, for instance, are 12% lighter, 28% stronger than former 3" channels

unit is effective in emergency for fighting fire.

Light construction gangs, of which the Bureau employs 26, use 17,500-lb.-gross-capacity units, which serve both personnel and supply purposes. One of these serves to emphasize design trends which the Bureau is incorporating into other units that it builds. Construction is of Cor-ten steel, arc-welded.

The body of the light overhead truck is 7 ft. wide by 12 ft. long.

Floor framing consists of two longitudinal sills to which are welded the cross beams. Longitudinal sills are 1 x 4-in. by 10-gage channels with an oak filler which rests flatwise on the chassis frame and eliminates metal to metal squeaks. Longitudinal sills are not intended to give body strength, but to hold the floor framework together during construction, and after the body is completed to provide a means of securing body to chassis with U-bolts around sills and chassis frame. Cross beams are 3½ x 2-in. by 10-gage channels. Cross members holding the universal sheave block and foot plates for the tripod pole derrick are double channels welded to form a box section of greater strength. The flooring is 16-gage diamondette plate on ⅞-in. oak.

Above the floor, framing consists of quarter-round corner posts pressed from 16-gage sheet (14-gage on the larger trucks) and quarter-round roof sections of the same gage. A small "orange peel" shaped section is bumped out by hand to form a smooth section at the junction of the corner post and roof sections. Jambs for the cabinet doors are ¾ x 3-in. channels, pressed from the same gage metal. Framing at the back of the cabinets consists of 1½ x 1½ x ⅛-in. angles and 1¼ x 1¼ x ⅛-in. tees.

Boxes below the floor are fabricated from 16-gage sheet and bolted to the floor framing. An 8 x 16-in. box section is bolted below the frame to form a tunnel between the two rear lower boxes. The rubbing rail is pressed from 16-gage sheet and bolted in place, masking the seam formed by the boxes. Rear fenders are made from two pieces, the main body of the fender and an outside flange, welded together and bolted in place.

Front and side panels and cabinet doors are of 18-gage sheet. The latter are hung on continuous hinges and locked with a three-point latch and padlock. The hinges are spot-welded to doors and bolted to jambs, and are pressed from sheet metal, doubled over the hinge pin so that the hinge cannot spread.

The cab provides comfortable seating for 5 or 6 men. A drop leaf, hinged to the rear of the front seat, forms a writing table.

On the right side, the front cabinet contains an insulated water jug with faucet extending through the front panel, and a detachable niggerhead and winch shaft extension. The second cabinet is lined with plywood and outfitted for sharp-edged tools.

Over the rear wheels is a cabinet fitted with trays for pole hardware and supplies. The trays are adjustable, being supported by bolts through a series of holes on 1-in. centers in the ends of the cabinets. A rear cabinet is used for tools, supplies, presto-lite tanks, etc. Top of the body is normally open, but in inclement weather may be covered with canvas.

Exhaust gas is released overhead to the rear, exhaust pipe being carried upward, inside the right rear corner of the body. The muffler is at rear to reduce noise.

A traveling sheave is mounted on a bar at the rear to aid in loading heavy equipment like transformers. A tunnel on the left side can accommodate a tripod pole derrick. An eye below the sheave bar is used in raising the derrick, special bracing being provided in the framework. A universal sheave block is held in a socket at the rear of the floor. Machinist's vise and payout reel have stubs to fit this socket.

Jacks attached to the rear of the body are used for stabilizing. An 18-ft. extension ladder is carried in a tunnel to right of the aisle. Pike poles are carried in a tunnel on the upper left hand side and are held with leather straps around bars at front and rear. Lower down, on the left, are supply cabinets with doors opening on the center aisle. These contain hemp-rope reel and wire-rope winch. Cross arms are carried on the left side of the aisle floor.

Heavy line construction crews use a 26,000-lb.-gross-capacity truck and a light express truck. The heavy is of the same design as the light construction truck described above, except for size, the body being 7 ft. 6 in. wide by 15 ft. long.

The use of Cor-ten steel throughout, except for flooring, helps to strengthen the body and lighten the weight. Cross beams are 12% lighter and 28% stronger than the 3-in. structural channels formerly used. The lower boxes and other parts of 16-gage Cor-ten are 22% lighter than the former fabrication of 14-gage plate. Panel sides of 18-gage Cor-ten are no lighter than formerly used, but larger sheets can be used without warping during arc welding, and the Cor-ten is resistant to denting and rust.

Sell Your Home-Town Public, Says NWEL&PA

DETERMINATION to convince, not the government, but the home-town public that private power companies are best qualified to distribute the tremendous quantities of electric power now and soon to become available in the Northwest characterized the meeting of the Business Development Section, Northwest Electric Light & Power Assn., in Portland, March 16-19, under Chairman W. A. Huckins, of Utah Power & Light Co. This idea permeated the preliminary addresses of the executives and was accepted as a challenge by the commercial men themselves.

After a very frank welcoming talk by Lester E. Humphreys, assistant to the Portland mayor, in which he described his personal opinion of the weakness of civil service and governmental efficiency, Franklin T. Griffith, president of Portland General Electric Co. and dean of the industry, demonstrated his

C. J. STRIKE

sincere public-spirited viewpoint by unexpectedly calling upon the entire meeting to rise in respect to the memory of the late Bonneville administrator, J. D. Ross.

Griffith then laid down a realistic picture of the situation facing private industry in the Northwest. He pointed out that the existence of Bonneville and Grand Coulee is real, that both will be completed and that the government must find a way to put this power to use in order to make its investment pay. "You can't fight the treasury of the U. S. and win," Griffith said. "We must do everything in our ability to join in solving the problem of utilizing this power instead of putting ourselves in the way of a juggernaut. We should never stop trying to cooperate with the government, even though we be rebuffed time after time. Can't we convince the authorities that the load they seek can be obtained more quickly and efficiently through the medium of our networks and companies than through other competing agencies? Basically, we cannot expect this unless we can convince the authorities that the real tangible benefits of this development will be passed on to the public as rapidly as possible."

This keynote was picked up by many subsequent speakers and further developed.

LeRoy A. Grettum, association president and vice-president and general manager of Eastern Oregon Light & Power Co., talked, however, on appreciation and recognition of salesmen by management.

Victor Hartley, executive secretary of the Pacific Coast Electrical Assn., invited the Northwest association to join his group in a convention of the whole Western electrical industry at Del Monte, May 16-18. The executive committee later recommended participation and named President Grettum officially to represent the Northwest.

K. M. Robinson, president of Washington Water Power Co., started a group of short executive addresses by agreeing with Griffith that competition with the government is impossible. He asked whether rates and service had really been the issue, since private companies had given both. Pioneering may have just begun, he commented, if the industry must learn now how to swallow more millions of kw.-hr. But, he reminded the assemblage, the industry must remember that in the last analysis, not the companies, but the public will decided how this power is to be distributed, and the public will have to be sold on this distribution.

L. T. Merwin, president of Northwestern Electric Co., substituted for Paul D. McKee, president of Pacific Power & Light Co. Speaking on commercial responsibilities, he reiterated the fundamental principle that service to be profitable to customer and company must be derived from sound advice and a study of the customer's real needs. It must not be oversold or undersold.

J. A. Hale, vice-president of Utah

F. T. GRIFFITH

Power & Light Co., reviewed the progress of salesmanship as a profession. Since salesmen are to be the spearhead of the struggle between two opposite philosophies of government, he urged that they make themselves far more proficient.

C. J. Strike, president of Idaho Power, although not programmed for this session, cited the situation of the home-town stores threatened by chain-store competition. He pointed out that where the local store was doing an excellent job of serving the public, the chain stores had difficulty in getting started: the public was not inclined to foresake the old-timer. Nor would power companies be forsaken if they did an outstanding local job.

"Power to Sell," the theme of the meeting, was placarded over each of the meeting rooms in which were assembled the residential sales bureau, under Chairman George Madison, Portland General Electric; the commercial and industrial sales bureau, under C. T. Bakeman, Puget Sound Power & Light; the rural sales bureau, under Earl A. Olson, Idaho Power, and the advertising committee, under Gilbert L. Stanton, Idaho Power. The residential sales bureau included two groups: the home modernization committee, under J. F. McAllister, Utah Power & Light, and the home service committee, under Ralph Gale, Idaho Power.

In making his report at the Friday-afternoon general session, McAllister

declared the purpose of his committee was that of combining the agencies in the selling field to further electrical utilization and to meet the challenge of absorbing Bonneville power.

W. A. Cyr, associate editor of ELECTRICAL WEST, presented a burlesque talk advocating more and funnier kinds of water heaters.

Ralph Gale, summing up the work of the home-service girls, recommended that this work be directed toward more dealer cooperation, toward work with other women employees, toward the

HUCKINS & SNOW

adequate-wiring program and in public-relations. Madison further recommended that the chairmanship of the home service committee each year be assigned to a male executive.

In a carefully prepared analytical paper, Earl R. Wooley, new sponsor in the Pacific Northwest for Ebasco Services, outlined a sound policy for dealer-utility sales development for better business and better customer relations. Called on to address virtually every committee meeting during the morning and afternoon of committee sessions, Wooley in each case analyzed the problems of advertising; home service, and residential, commercial, industrial and rural sales.

In his report on the advertising committee, Stanton quoted from a paper presented by James Lightbody, B. C. Electric Railway Co., urging that utility advertising be written with more sparkle and with fewer extravagant statements.

H. J. Morton, representing the Association of Edison Illuminating Companies and the Edison Electric Institute, reviewed the wiring problem in terms of copper carrying capacity. Although load is increasing on a basis of 5 kw. per year per customer, the rate of increase of copper carrying capacity is only one-half of 1%, he said. Under present wiring methods, more of the wiring dollar goes into all the other attributes of wiring. Of the 17 wiring systems permitted in the code, less than 5% represent copper, the only part conducive to adequacy. He maintained that a wiring system must have four basic requirements: It must be safe, it must have copper, the circuits must be accessible to provide increases and the price must be such that the public will buy.

The association he represents, Morton said, has been conducting an engineering study of the problem and has developed a concentric wiring system which has been installed experimentally in 350 cities. Older types of wiring, he declared, at $4 per outlet for an average residence, have an average number of outlets or points at which service may be used of 25; and they contain only 19 lb. of copper. With the new system, a larger proportion of the system is in copper, less in insulation and mechanical protection. Units installed have been raised from 25 to 70, at an average cost of $2 per outlet. In the 350 communities, tests show the number of outlets to run up to 100, at an average price of $1.75 per outlet. He urged that the sales group of the industry now take on this promotion, that conferences be held to develop mutual trade interest in promoting such wiring and that the four pamphlets soon to be published on the subject be studied and used.

Saturday morning's general session heard the conclusions of committee chairmen in commercial, industrial and rural sales.

"Fundamentals of Rate Making," a paper by S. P. MacFadden (ELECTRICAL WEST, Jan. 1939), was read by Pat Johnson, Puget Sound Power & Light.

Following the rural sales committee report, F. Earl Price, of Oregon State College, emphasized the need of supporting more research in agricultural power use. With charts he illustrated the significance to the electrical business of a study of trends in farm-crop markets. His example was the decline of the Pacific Coast poultry industry, a large power user, which suffers from high freight costs and the length of time to transport eggs and birds.

Ashton B. Collins, inventor and sponsor of the Reddy Kilowatt Service, explained the philosophy of humanizing, simplifying and personalizing the industry by means of a trade character. It's increasingly apparent, he said, that salesmen have fallen heirs to a complicated electric-service story which they must get over to the public by simple methods. However, a repackaging and popularizing of electric service is now bringing favorable reaction to many companies.

Closing the final session, C. J. Strike returned to give his inspirational talk, "Now Let's Go to Work." After stating that business wants the government to return to its original function as umpire, he spoke of the consumer cooperative movement, financed by the government, which threatens all business on main street just as the electrical industry has been threatened for years.

In order to meet this threat, he urged that utilities go straight to their communities and lay their cards on the table. Because if utilities showed that they, like smaller business, are built step by step and piece by piece to supply community needs, then any business man could see the unfairness of the government's stepping in with a brand new model business, subsidized and using all the past experience of those whom it would put out of existence. The community, Strike said, should be made to feel some responsibility in the situation. And above all the private power company's ability to do the best job of serving the public must be proved to all the folks along main street, and not in Washington.

Registration at the meeting reached a high of 280. Committees on arrangements were headed by George H. Wist-

H. J. MORTON

ing, assistant general manager, Northwestern Electric, and A. C. McMicken, general sales manager, Portland G.E. In charge of hotel arrangements was J. B. Buman, Northwestern Electric; publicity, Webster Jones, Northwestern Electric, and Ralph W. Millsap, Portland G.E.; Bonneville trip, J. D. Scott, Portland G.E.; trip to Timberline Lodge, B. P. Baily, Pacific Power & Light; golf, G. A. Boring, General Electric Supply. Berkeley Snow, executive secretary of the association, directed registration and supervision of all details of the meeting.

Agenda

More about the activities of Western electrical men

What are the various electrical associations doing? Here's the answer—a resume of all past and future activities:

Electrical Maintenance Engineers' Assn. of Southern California—About 175 persons attended the February meeting to see the Metropolitan Water District film, "Thirteen Golden Cities," and to hear Graham Holabird, National Electrical Products Corp., speak on "What the Electrical Industry Means to You." Speaker at the March 21 meeting was Walter Meyer, sales manager of Allis-Chalmers, on V-belt drives.

San Francisco Electrical Contractors' Assn.—Celebrated its 33rd anniversary at the banquet at which 1939 officers were installed. In charge of the entertainment program were Edward Dowd, Dowd-Seid Electric Co., and Ted DePass, Standard Electric Co.

Electric Club of Washington, Seattle Chapter—Had an adequate-wiring exhibit at the National Housing Exposition in Seattle, March 25-April 2. Purpose was to stimulate interest in adequate wiring and new home construction. Regular meetings are on Mondays.

Santa Barbara (Calif.) Chapter, NECA—Spring lighting forums are being held at 114 E. Carillo St., March 20-27 and April 3, 10, 17 and 24. Speakers at recent meetings were H. Dobson, Santa Barbara inspector, and H. G. Ufer, Underwriters', on code and laboratory testing and proving of new items.

Idaho Adequate Wiring Bureau—Will hold meetings this month in Payette, Boise, Twin Falls and Pocatello for the purpose of discussing rates and explaining them to all dealers and contractors. J. H. Butler, rate engineer of Idaho Power, will speak.

Electrical Contractors' & Dealers' Assn. of Sacramento—Meets regularly on the second and fourth Wednesdays of each month at 1010 25th St.

San Francisco—Bay Cities Section, IES—Speakers at Feb. 23 meeting were Albert R. Williams, architect, and C. Stanton Loeber, president of the California Camera Club.

Southern California Section, IES—William P. Bear, P. G. & E., San Francisco, spoke March 14 in Los Angeles on "Treasure Island Lighting."

Electrical Contractors' Assn. of Alameda & Contra Costa Counties, Calif.—Meets every Friday noon at the Athens Athletic Club, Oakland.

San Francisco Pot & Kettle Club—Met Feb. 21 with the California Retail Hardware Assn. at the Western Furniture Mart. Speakers were Ralph W. Carney, general sales manager, Coleman Lamp & Stove Co., and Frank K. Runyan, vice-president of the mart.

Southern California Chapter, IAEI—Met at Beverly Hills March 29 to discuss inspector problems. Will meet at Long Beach, May 24 for the same reason.

Central California Chapter, IAEI—Speakers at the Feb. 24 meeting were K. W. Keene, associate electrical engineer, and R. J. Larrabee, field engineer, both of Underwriters'. Code problems were discussed by J. W. Cary and D. A. Demanty. Next meeting is to be May 26 in Fresno.

East Bay Electric Club—George C. Tenney, ELECTRICAL WEST, spoke March 13 in Oakland.

San Francisco Electrical Development League—Speakers at recent meetings were: (March 20) Almon E. Roth, president of the San Francisco Employers' Council on "The Need of Employer Organization in Collective Bargaining"; (March 27) Lloyd Wilson, public-relations director of the YMCA on "Youth Marches On"; (April 3) Dr. Paul Cadman, president of the American Research Foundation on "The 1939 Model of Government Appeasement to Business". The April 10 meeting will be conducted by new members and will consist of a number of short talks.

Rocky Mountain Electrical League—The Accounting and Engineering Divisions each held a two-day meeting in Denver, March 27-28. Engineering subjects covered employee personnel problems, public relations, public liability and engineering and operation. Accounting division was largely concerned with the new classification of accounts effective in Colorado Jan. 1, 1939. Harry Adler was in charge of the accounting session; L. M. Robertson headed the engineering session.

Utah Chapter, AIEE—Heard A. F. Dickerson, manager of the G-E illuminating laboratory, Schenectady, talk on Golden Gate Exposition lighting, March 13.

Dinner

S. C. League is host to 400 architects and engineers

Electrical Development League of Southern California and the local chapter of the Producers' Council Club of Southern California were hosts to over 400 architects and structural engineers at a dinner meeting March 2. This marked the first time that every branch of the southern California electrical industry had attempted to tell its story as part of an all-inclusive program.

SHEPHERD

Adequate wiring was the theme of the meeting, since the "voice of adequate wiring" (Walter Stickel, of the development league) preceding each of the several acts showed how the thought behind these acts was related to wiring.

W. B. Cheney, Southern California Edison Co., acted as interlocutor for the meeting. Lighting was discussed by J. L. Fugate, Wagner-Woodruff Co., and T. H. Shepherd, Los Angeles Bureau of Power & Light; domestic appliances, by William Moje, Los Angeles Bureau; electrical apparatus, by E. W. Morris, Westinghouse Electric, and J. A. Corlett, General Electric.

MOJE

Assisting Stickel were D. J. Murry, G-E, and R. L. Gill, Bryant Electric. Script was written by Mrs. Helen Hodges, Los Angeles Bureau, and R. E. Smith, Edison company. The production was supervised by F. L. Hockensmith, general manager of the development league, and J. M. LaMontagne and H. H. Bullock, Producers' Council Club.

State-Wide

Will be the April 22 meeting of California contractors

Electrical Contractors' Assn. of Northern California and the Los Angeles Chapter, NECA, will meet in Fresno, April 22, for the first state-wide meeting in several years. Need of a unified stand on important state issues is bringing the groups together.

First item on the program will be a revised interpretation of the California State sales tax in order to release actual construction materials from the tax except at the source. This would place the tax collection in the wholesalers' hands unless a contractor elects to collect the tax and account for it directly to the state.

A large part of the meeting will be devoted to sifting out construction-industry legislation pending before the state senate and assembly for support or opposition. Two of these proposed measures relate to state inspection. One of them would increase the Industrial Accident Commission's inspectors' staff so that it might do a better job of inspection of industrial and commercial occupancies in rural areas. Several amendments to the contractors' license law are also to be discussed.

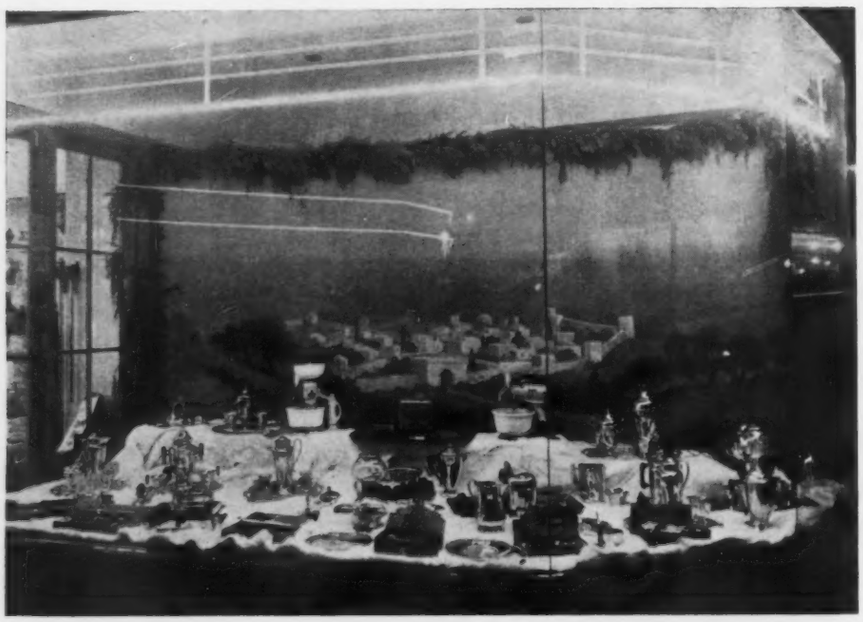
K. M. Ryals, president of the northern group, and Clare Smallcomb, of Los Angeles, will preside jointly.

Opposition

Air-conditioning society fights proposed hiring law

Bill which would require the hiring of an engineer to be in constant attendance over any ice or air-conditioning machine of 20- or more ton capacity has aroused plenty of opposition among air-conditioning concerns throughout California.

Although it was not on the scheduled program, members of the San Francisco Air Conditioning Society last month discussed the subject at length and passed several resolutions pointing out the impracticability of such a law and the extra financial burden it would put upon owners of an air-conditioning installation.



Dressing

Collonan Electric Co., San Francisco, exemplifies the window-dressing philosophy of the majority of Berkeley dealers—lots of appliances tastefully arranged. This is an appropriate Christmas display

WINDOW-DISPLAY contests aside, what is the best kind of window dressing? What kind will bring the most pedestrians into a dealer's store and help him sell appliances?

That's a question which has bothered electrical-appliance retailers from the moment they went into business. Chances are it will continue to bother them. Because no one can prove to the satisfaction of somebody else what kind of display produces the best results.

For proof, consider the trials and tribulations of a number of electrical dealers in the City of Berkeley, Calif.

If you know your Berkeley, you'll realize that these stores face keener competition than those of many other cities. Berkeley's population is 86,300. The city butts into much larger Oakland and is only 30 min. by bridge from San Francisco. Yet within five city blocks there are well over a dozen electrical stores. This, of course, is in the central shopping district along Shattuck Ave. Spread out as it is from hither to yon, Berkeley boasts other smaller shopping districts, almost every one of which also supports an electrical dealer.

But it is those stores along traffic-ridden Shattuck Ave. which offer the real test. Each one has to meet the competition of the next one. Consequently, each one has to depend to large extent on its window displays.

What have the store owners or managers discovered? Let's take a little shopping tour, starting at White Electric Co.

White's is a medium-sized store handling almost every kind and form of appliance. S. Gates, the manager, is somewhat puzzled about his displays. Nevertheless, he follows a fairly definite scheme of result-getting arrangement.

Small appliances with plenty of price tags in prominent places attract peoples' attention, he says. Big appliances don't pull unless some central agency (in this cast it would be the Electric Appliance Society of Northern California) sponsors a campaign, and dealers all over town carry large displays of the same appliance. Specials on high-priced toasters or waffle irons, etc., don't pay, because the average person thinks the price is still too high. "Displaying a $2 special on Toastmasters, for instance, doesn't mean extra sales," he says.

So what does Gates do? He exhibits a conglomeration of large and small appliances in his big front windows. These are purposely arranged as low as possible so that the pedestrian can see into the store. In other words, the whole store is a display window. Gates is so firmly convinced that this is the best arrangement that he would like to tear out the foot-high dais on which his window displays are set up.

Ralph's, The Electric Appliance Shop, is a smaller store handling small appliances. Manager-Owner Ralph Hagopian agrees with Gates. He likes to cluster a lot of appliances—either all waffle irons, say; or waffle irons, toasters and coffee makers mixed—on his display stand. And, he says, price tags are essential.

But there is one flaw with this plan. During the course of the year, pseudo customers carry off about six appliances from the window display. This is, to say the least, disconcerting. And it leaves Hagopian between the devil and the deep blue sea. If he puts a wall, high enough so that customers cannot reach over it, around the dais, then he will cut down on theft; but at the same time he will prevent pedestrians from looking beyond the windows into the back of the store. Hagopian wants people to see the whole works.

University Radio & Electric specializes in radios, refrigerators and sunlamps. It fits out its windows with a representative line of everything in the store—unless, of course, it is featuring one item, in which case it displays more of this. And again, price tags are important. "If people don't see the price, they won't come in," University men say.

Bradshaw Electric Co. has less window-display space than most of the stores. It also faces at least one tougher problem: It is only a few doors away from a five-and-dime and a super-cut-rate drugstore, both of which play up small appliances at prices which can't be equalled.

So Bradshaw's, according to Wallace Hartley, never uses price tags in its window displays.

"Not even on coffee makers or roasters?" you ask.

Not even then, says Hartley. Coffee makers and roasters are nationally advertised and people know how much they cost. So there's no sense telling them again.

"And we don't use price tags on novelties because they attract people anyway. Pull people into the store because they are novelties."

Bradshaw's single window is filled with many different items. Hartley says the only time they broke this rule was when radio was new and a big set, partway stripped down, was on display all by itself.

"What about display cards?" you ask.

"Unless they're very good, they're not worth buying," Hartley says. In that he agrees with Gates of White Electric.

And one other thing: Bradshaw's also keeps the back of its window open so that pedestrians can look into the store

Store Windows

To Meet Competition

and see all the stock. "We tried a back to the window display once," Hartley says, "but it didn't help. It hurt us.

"People came in and asked about a certain item in the window and most of the time they couldn't describe it so that we knew what they were talking about. When a person sees something interesting in a window, he likes to come into the store and point directly at it. They couldn't do that when we used backing, so we tore that out."

Maxwell Hardware Co. is bigger than any of the stores we've visited so far. Appliances are, naturally, only a small part of the store's stock; but they're important and they are played up at all times.

Here, however, we begin to run into some different thoughts about window treatment. Edward Davey, assistant manager, is dead set against cramming his windows with a lot of appliances. He likes to arrange them attractively, with good display cards. Never does he let a toaster encroach on a waffle iron's preserve. If he is displaying several different small appliances, he keeps each appliance in its own group. Toasters over here, waffle irons here, sandwich makers here.

As for price tags, it's fifty-fifty. Maybe, because of the proximity of a cut-rate drugstore, the weight is slightly on the side of no price tags.

When it comes to big appliances, Davey is even more definite about what he believes.

"Some time ago one of the companies sold us on the idea of buying a big show-card which covered the entire back of the window. This was attractive enough. And it listed all the advantages of the refrigerator displayed. But there was only one refrigerator. Sales were pretty poor."

So Maxwell's has forgotten all about large show-cards now. When refrigerators are to be displayed, they're displayed in groups of three or four. All different models. With them are some small display cards and perhaps a part of the refrigerator—the meat-storage drawer, say.

Off in one corner by itself in this window-dressing business is Hink's Durant St. Appliance Store. This is to be expected. Hink's is Berkeley's largest department store. As such, it naturally goes in for more elaborate and striking displays.

R. D. Black, manager of the Durant St. store (which is separate from the main store) indicates this in his philosophy.

Only when Hink's is offering a small appliance for sale does it fill its display windows. Then, says Black, he plasters the appliances all over the place. With plenty of price tags.

But in the long run, single items make the best displays. If roasters are to get the nod this week (unlike most of the other stores, Hink's changes its windows at least once a week), then three or four roasters are grouped together in the display. This means, of course, that the display is tricked out with special lights, etc. Small display cards near the roasters give suggestions about their use and tell what can be done with them.

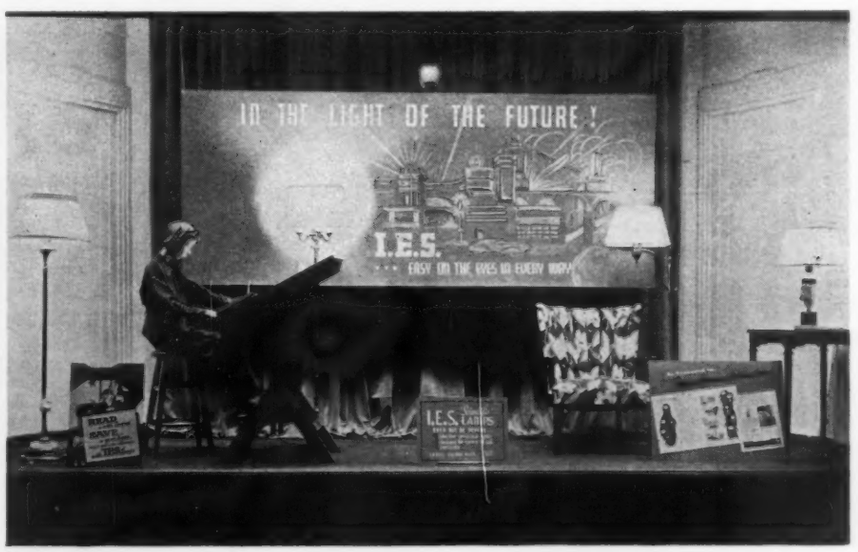
The same holds true for large appliances. Two ranges, for example, are all that Black will set up in one window. One is arranged to give the pedestrian a good idea of the exterior; the other is opened up, and signs tell what each individual feature does.

"It's even better," says Black, "if you tie the range in more closely with cooking. Open the oven door and show the oven full of pots and pans cooking a full meal. Give the pedestrian some idea as to how well the range can cook a meal. Offer cooking suggestions."

And there you have the story. But what does it mean? Simply this:

If the dealer's store is medium-sized or smaller and is not set up to handle large and fancy displays, then the owner should follow the lead of the majority of Berkeley dealers and fill his window with a lot of appliances, as tastefully arranged as possible. Price tags should be exhibited to advantage unless the store is too close to another store which habitually cuts prices. Experience has proved that this kind of arrangement draws more people and makes more customers than any other.

If, on the other hand, the dealer's store is large and there is plenty of money to bear the cost of elaborate displays, then the owner should follow the lead of Hink's and, to a certain extent, Maxwell's and show only a minimum number of appliances in each window. If traffic by the store is good and regular customers are somewhat richer than the average, this kind of arrangement will draw best.

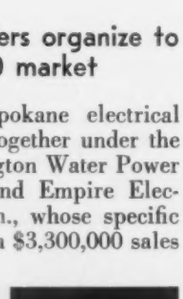


The Bon March, Seattle, was first prize winner in Puget Power's IES display contest. This is what Hink's might do

Association

Inland Empire dealers organize to reach a $3,300,000 market

More than 100 Spokane electrical dealers have banded together under the inspiration of Washington Water Power Co. to form the Inland Empire Electrical Equipment Assn., whose specific purpose it is to reach a $3,300,000 sales market in 1939.



HEBBERD *Ihrig*

Chosen president of the association, which represents all phases of the industry, was Charles Hebberd. Vice-president is Harold Bacon; secretary, Lewis A. Lewis, and treasurer, Alvin Jensen. Directors are L. R. Shahan, E. S. Bergquist, R. C. Nelson, Harry B. Rogers and R. J. Franks.

At the organization meeting Feb. 21, attention was drawn to the fact that, in spite of the high electrical usage in the Inland Empire, there still remain 18,000 homes without electric washers, 37,000 homes without refrigerators, 44,000 homes without ranges and 62,000 homes without automatic heat.

According to Kinsey M. Robinson, president of the power company, at least half of a $100,000 advertising budget will be placed at the disposal of the new association for "use" advertising. Copy will run over the association's signature.

Similar cooperative associations are being formed in other towns in the utility's territory.

Use Values

Hotpoint dramatizes them in a series of meetings

Use values which consumers really seek when buying appliances were explained and demonstrated dramatically to hundreds of utility and dealer salesmen throughout the West at a series of seven meetings staged by the "Hotpoint Use Value Revue." Meetings were conducted in El Paso, Los Angeles (two), Sacramento, Portland, Seattle and Spokane by D. C. Marble, range division manager; M. H. Beekman, kitchen sanitation division manager, and Mary L. Schwinn, home economics department manager, all of the Edison General Electric Appliance Co. Chicago headquarters staff.

Electric cooking, water heating and dishwashing were featured in the program. Notable practical demonstrations included a quick way of demonstrating the greater efficiency of automatic electric water heating compared with the furnace-coil method by passing metal through a flame; a visual demonstration of the various amounts and kinds of heat produced in a Hotpoint range oven; the various heat intensities available in the new type range units, and a simple method of demonstrating the way surface-cooking heat is accurately controlled electrically by placing a piece of cellophane between utensil and unit. Possibilities of the electric dishwasher were brought out forcibly, lending support to the contention that this is the next major item of electrical merchandise which will profit dealers, utilities and particularly the customer.

A supplementary demonstration, by means of shadowgraphs, showed the efficiency of electric range elements as compared to fuel types and the manner in which an electric water-heater element functions.

The meetings were sponsored by Hotpoint distributors and the utilities in the various cities visited.

B. C. Sales

What is being done to push and coordinate selling

Through unity the British Columbia electrical industry is striving to meet its objective of $3,390,000 worth of new business during 1939.

This was the thought brought out at the Vancouver banquet marking the conclusion of the home appliance sales school held late in February by B. C. Electric Railway, Canadian General Electric, Canadian Westinghouse and Northern Electric. More than 280 persons attended the two-day meeting.

The $3,390,000 objective is broken down as follows: $1,800,000 for dealer appliance sales; $600,000 for B. C. Electric appliance sales; $110,000 for installation of appliances sold; $180,000 for electrical work on 2,000 new homes; $120,000 for electrical fixtures in 2,000 new homes; $190,000 for wiring and new fixtures in existing buildings; $250,000 for industrial power and heating; $50,000 for commercial power and heating, and $90,000 for line extensions and interior wiring for 1,200 new rural customers.

Speakers at the banquet included W. G. Murrin, president, and W. C. Mainwaring, general sales manager, both of B. C. Electric, and W. J. Walton, of the Retail Merchants' Assn.

Several interesting ideas were brought out at the sales classes:

Use of the word "fixture" for lighting equipment is putting a bad idea into home-owners' heads, Miss Rae E. Jackson, of B. C. Electric, declared. The word is a relic of the early days when lighting was unreliable; when new lighting units were developed, they were said to be permanent. "Fixture" has carried over to the present day.

In order to make people shake the notion that lights need not be—should not be—permanent, salesmen must ignore "fixtures" and concentrate on the job of showing housewives that when they redecorate their homes they should also replace their lights.

To sell ironers, said E. N. Hurley, president of Hurley Machine, salesmen must be able to demonstrate ironers by themselves. They have to go out at night to close sales when the husband is in the home.

"In home demonstrations," he said, "don't be satisfied with just one. Make your first demonstration a good one, not just 15 or 20 min. long, but iron all

D. C. Marble shows how the new Hotpoint 2-gal. water heater operates. Mary L. Schwinn removes cellophane from between utensils and range units on simmer heat for an hour.

the wash. Then about a week later go back and give another demonstration, and then miss a week and go back two weeks later. It is these second and third demonstrations which will close sales."

Not connected with the sales school, but aimed nevertheless at the same goal is the Electrical Service League of British Columbia's current drive to increase membership by interesting suburban dealers in its work.

The drive has two objectives: It is felt that the additional membership fees will strengthen the league and enable it to render greater service to all branches of the industry; it is also felt that the merchandising and promotional events planned by the Home Appliance Council, a committee established by the league, can reach the highest possible degree of success only with the united support of all dealers.

To attract dealer attention, the league has developed a cooperative program of appliance merchandising. This is based on figures which show that ranges are now found in only 13.2% of the low-income bracket homes in greater Vancouver; refrigerators, in 10% of the homes; washers, in 42%; ironers, in 3%, and radios, in 79%.

In seeking to encourage dealers to concentrate on their neighbors in their own trade area, the league suggests the following points of attack: "Put your sales efforts to work on the high-income replacement market. Key your service department to give better service and lead you to the replacement market. Sell your low-income market a trade-in model if they cannot afford a new appliance. Plug the appliances which your customers can use economically. Advertise and promote appliances which will attract attention of prospects to your store. Give your salesmen an opportunity to follow up leads made on the floor."

The league program, as developed, includes many campaigns and special events this year.

Clover Show

G-E play proves that appliance business is still good

Dealers and salesmen are almost always told straight from the hip how to sell the merchandise displayed in a manufacturer's show. But General Electric's appliance and merchandise department this year did it by example in one of the most compact shows offered dealer audiences in the West, "Getting Over Into Clover."

Two ex-Westerners were prominently identified with the production. Ralph Cordiner, manager of the department, appeared in a film, serving as the division between the show's two acts, in which the year's objectives were announced. A. M. Sweeney, former manager of the G-E lamp works in Oakland and now manager of the refrigeration division, piloted the show through Western cities.

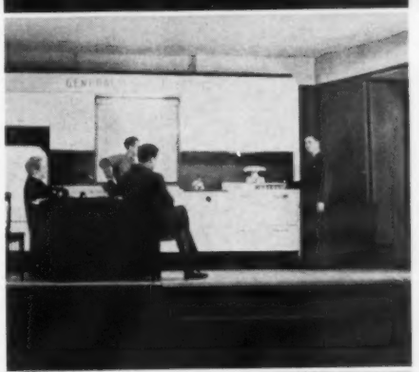
The G-E dealer program for 1939 was ingeniously woven into the story of Fred Warner, veteran dealer, and his son Tom. Somewhere in some scene, every appliance in the line was brought forth; every detail of the advertising, store-display, financing and franchising program expounded.

The story of the Warners was simple, yet forceful. Fred Warner, who handled a motley line of appliances, was losing money. He wanted Tom in business with him, but feared for the future of the electrical business. Together they visit an old general store where Warner started years before. Here they learn that the first fundamental of selling is to have good merchandise that sells itself.

Tom then visits a successful G-E dealer, who introduces him to the G-E wholesale specialist. When Tom invites him to see his father, the franchise program is explained, the advertising program outlined and the advantage of selling not only the refrigerator, but also the range, dishwasher and complete kitchen and laundry is shown.

Moral of the play was driven home as hard as the G-E name, product, policy and merchandising plan. It was that "to get over into clover," a dealer must concentrate on one complete line, put lots of energy and enthusiasm back of it, adopt the manufacturer's promotion program and take pride in being in the electrical industry.

Even more, the show proved that the electrical business is good, that it holds fine opportunity for the wide-awake dealer and salesman and a future of unpredictable possibilities.



The General Electric show from start to finish. At top is A. M. Sweeney, opening the production. Various scenes follow

Discovery Survey

Edison company gets 5,000 replies to range campaign

An effective means of disclosing electric-range prospects and at the same time emphasizing the economy of electric cookery in the minds of thousands of southern California housewives is contained in the "discovery survey" sponsored by Southern California Edison Co.

Domestic customers who do not use

electric ranges were advised of the survey by an announcement in the February issue of *Electrical Times*, Edison consumer magazine. The announcement, the only one made of the campaign, invited customers to submit on the enclosed prepaid card an estimate of the cost of cooking three days' meals for four people on an electric range. Menus for each meal were given in detail. The company offered a free aluminum cookie sheet to each customer making an estimate and granting a sales interview to the Edison representative delivering the sheet.

As a part of the follow-up material for salesmen, the Edison advertising department, under the direction of R. G. Kenyon, advertising manager, prepared a broadside announcing the actual cost figure—19¼c for the 36

Los Angeles County Sheriff Eugene Biscailuz seals the meter of the Edison company's discovery survey test range

meals—and telling the complete electric-range story. Sheriff Eugene Biscailuz, of Los Angeles County, well known to all southern Californians, was pictured on the cover sealing the meter which recorded the current used by the Westinghouse range that cooked the meals under conditions prevailing in the average home. Cost was determined on the basis of the average rate per kw.-hr. paid by Edison domestic range users.

"The survey brought an immediate response that was gratifying," Kenyon said. "To March 10, more than 3,000 cards had been received, and we estimate that the total replies will reach 5,000. This indicates the keen interest among housewives in electric cooking, and the number of estimates which approximate the actual cost figure indicates that the company's range economy advertising program has registered."

Future Campaigns

Outstanding events feature dealer-utility activities

"More and faster sales" is the cry emanating from all parts of the West. So those utility-dealer campaigns which have been scheduled for the next several months are more intensive than ever. Here's a resume of them:

Electric Appliance Society of Northern California—Annual refrigerator campaign will be held from April 10 to May 6. Slogan for the drive is: "The Inside Facts—More Than Ever in 1939 an Electric Refrigerator Pays for Itself." Obviously, the economy angle will be played hard. The proof of the story will be the same as last year. Four little countercards will feature happy Scotchmen, each acting out a different idea—the value of lower operating cost, of controlled cold, of controlled humidity and of greater storage space. Pacific Gas and Electric Co. will supply the advertising which will run over the society's name. There will be three ads in each newspaper in the territory. Radio, clipsheets and free mat service will also be used. Given away as prize money in a window display contest will be $240. Displays will play up the campaign slogan and use society materials. Each dealer submitting a picture of his window will be given monetary credit by the society. To stimulate local interest, the society will provide funds for each division of the territory. The divisions must match these funds and work out a salesmen's contest. Launched last month by the society was the new ironer merchandising plan. This will run throughout the year and will be culminated in the fall by an intensive campaign.

Idaho Power Co.—Ended April 29 will be the range campaign which started Feb. 27. A water-heating campaign will follow immediately thereafter. Highlight of the range drive is the "cookery quiz." All electric customers are invited to answer a list of 20 questions. These are largely factual and involve a considerable knowledge of electric cooking (a fact which gives dealers and salesmen a chance to make contacts). The twentieth question relates to the "range of the week"—the range which is each week given away as first prize. (No two makes are alike.) An essay contest gives judges a chance to grade papers. Other awards are 36 mixers, 36 combination sandwich grills and waffle irons and 36 cash prizes. The drive is also backed by newspaper, radio, billboard and direct-mail advertising. Range quota is 800.

Montana Power Co.—April, cookery campaign. May, cookery and refrigeration campaign.

Nevada-California Electric Corp.—April, refrigerator campaign. May, range campaign.

Portland General Electric Co.—April and May, range campaign. This will tie in with the Modern Kitchen Bureau's drive.

Puget Sound Power & Light Co.—April and May, range and water-heater campaign.

San Diego Bureau of Radio & Electrical Appliances—The 1939 Spring Fair will open April 25 and continue through April 30. As usual, the location will be the Palace of Better Housing, Balboa Park. Exhibits will be in the name of products rather than in the name of sponsoring organizations.

Southern California Edison Co.—April, roaster campaign. May, range campaign. The roaster campaign was launched March 9. Five makes of roasters are featured—G-E, Westinghouse, Proctor, Nesco and Everhot. A financing service plan is offered dealers through the Bank of America. A down payment of $3, plus sales tax, is required on roasters; balance is payable on exceptionally easy terms covering a year's period. One of the special offers of the campaign is the free gift of a pair of serving tongs to every woman who goes to a dealer's store or an Edison office and listens to the roaster sales story. The campaign, which ties in with the Modern Kitchen Bureau's national campaign, is supported by a promotion plan blanketing the entire Edison territory.

Southern Colorado Power Co.—April, campaigns on ranges, refrigerators, water heaters and irons. May is the same with the addition of roasters.

Utah Power & Light Co.—Quotas of 1,500 ranges, 750 water heaters and 600 IES lamps have been set for the three-months' cooperative drive started March 1. Feature of the campaign is a $25.10 set of Mirro aluminum cooking utensils given with each range. To offset the cost of this, $8 has been added to the list price of all range models. Name of the drive is "Up-We-Go" to tie in with Utah Power's sales slogan, "An Upward Line in '39." Included in the program are ranges manufactured by G-E, Westinghouse, Hotpoint, Norge, L. & H., Frigidaire, Kelvinator, Monarch, Estate, Sears and Montgomery-Ward. Set up has been a promotional fund of $8,000, of which distributors contributed $1,000. Newspapers, billboards and radio are being used extensively. The radio program was specially prepared for the occasion. Performances are staged in a Salt Lake auditorium seating about 500 persons. Tickets to the show are obtainable through range dealers. Provided for the power-company salesmen on both company and dealer range sales are extra commissions. Monthly and grand prizes will be awarded on the basis of highest percentage of quota achieved by individual salesmen.

Washington Water Power Co.—Started last month after the company had celebrated its 50th anniversary March 14 was a range and water-heater campaign.

Los Angeles Bureau of Power & Light—April and May, range campaign. The bureau will participate in the annual housing show in May.

Valley Electrical Supply Co., Fresno, Calif.—April, range and water-heater campaigns. May, range, water-heater and roaster campaigns.

New Mexico Power Co.—April, refrigerator and roaster campaigns.

Western Public Service Co., Laramie, Wyo. and Las Animas, Colo.—April, refrigerator and range campaigns. May, refrigerator, range and clock campaigns.

Mountain States Power Co., Casper, Wyo.—April, range campaigns supported by range schools.

Las Vegas (N.M.) Light & Power Co.—April, six-week campaign on electric cookery by all dealers tying in with the "guess again" program.

Public Service Co. of Colorado, Sterling—April, laundry-equipment, range and refrigerator campaigns. May, the same campaigns plus a special cooking school.

Sheridan County (Wyo.) Electric Co.—April, electric cooking campaign. May, refrigeration campaign.

Southwestern Public Service Co., Carlsbad, N.M.—April, campaigns on indirect lighting fixtures, refrigerators, ranges and small appliances. Roswell, N.M. — April, special school programs on better light. May, roaster and evaporative-cooler campaigns.

Western Colorado Power Co.—April, lamp-bulb, range and water-heater campaigns. May, range and water-heater campaigns.

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No. 4-c APRIL, 1939

Electrical West

Sales Guide

—the flowers that bloom in the Spring—tra-la-

sing a song that makes cash registers ring.

Clearing skies bring optimism, as well as spring housecleaning.

For any dealer this means renewed interest in fixing up the home—buying something.

And refrigerators, like hardy perennials, come back to bloom each year.

They offer a good margin, quick turnover.

To salesmen this means the stimulus of success, plus the satisfaction of more earnings.

More national advertising and more promotion of refrigerators clears the path of sales resistance for you.

The "bugs" have been taken out of new models—and that removes almost all service cost—resulting in more profit.

Besides, you can now—

Double Back over the Track

It's time to replace all refrigerators of 10 years ago

The old Model T used to be good transportation—in its day.

Same way with early model refrigerators—best to be had in their time.

But better refrigerators, like better cars, are what you sell today.

It's time to double back over all refrigerator customers of about 10 years ago. If you don't, some smart competitor will.

You have all of these new values to offer over the model of 10 years ago—use them to clinch more sales—

The 1939 refrigerator has more **usable space,** is more **accessible,** more **convenient,** operates at **lower cost,** more **efficiently,** with more **reserve power.** It is more **silent,** requires **less service,** is more **dependable.** It maintains **lower temperatures,** has more **extra capacity** for unusual weather or ice making demands.

It is **better looking,** has **more features** and services. Total **cost is less,** down payment and monthly payments lower, **terms longer,** carrying charge less. **Operating cost** is only about half what the 1929 refrigerator cost to run.

With these **plus** comparisons, go after the replacement business. They are enough to make anyone want to buy a new refrigerator.

What Electric Refrigerators mean to You

What to Say

The Good Old Food Story

It is still your strongest sales

Have you tired of telling the same sales story on refrigerators? Tired of telling the food preservation, the food savings, the food preparation story? It may be old stuff to you. You may think everyone in the world knows it by now. Certainly you may feel that people who are buying a new refrigerator and have enjoyed the use of one before should know it.

But checks made on users reveal that very few remember it. It is still new and fresh to them. And it is the strongest reasoning you can use to sell a new refrigerator.

Gadget appeal is going to be your big competition this year. All the sales shows of manufacturers stressed this. It is only natural. But gadgets should be used to **prove** your food story, instead of being made the main show.

Price may be the most worrying competition to you this year. The emphasis put on it by many will make your prospects price-minded. Your only weapon against price is the food story, well told.

This appeal sells more refrigerators than any other. It sells larger size of refrigerators. It sells the quality instead of the special or price line. It justifies a fair price and good margin.

So, tell your prospect—and prove it with actual data where you can—that your electric refrigerator—

Protects health, for it guards the family food supply against decay and spoilage.

Keeps the food sweet and appetizing for long periods.

Preserves the elusive vitamins that die when fresh foods are kept long at higher temperatures.

Improved taste and appearance of leafy vegetables for salads; makes them crisper.

Saves in buying, since extra quantities can be purchased at better prices and kept fresh until wanted.

Makes variety possible in meals, for leftovers can be kept longer and used long enough later in new dishes to make them seem new. Or they may be used in soups, jelly molds, or others attractive combinations.

Saves fuel, because extra quantities can be cooked at once, and kept until later.

Saves time in preparation of meals by having ready at hand previously prepared foods to be assembled quickly for a meal.

Makes entertaining easy since it provides ice for beverages, chills desserts quickly, holds a reserve supply of food for the unexpected and hungry guests.

STAMP OF APPROVAL

Recommended by Your

THE MONTANA POWER CO. • UTAH POWER & LIGHT CO.
IDAHO POWER CO. • CALIFORNIA OREGON POWER CO.

Comes First

appeal

Helps mothers because it is easy for the children to help with meal preparation, to make their own lunches, fashion successful salads and desserts easily and well.

- - -

Additional reasons for buying a new electric refrigerator that you can use to advantage include these:

Reduces the need for servants, by cutting the time necessary to prepare meals.

Saves steps and standing on the feet to prepare meals, for everything needed is kept close by.

Avoids traffic worries in shopping, for one trip a week to market will suffice.

Reduces losses from expensive last minute shopping in small quantities.

Decorates any kitchen—is a unit of the **all-electric kitchen—builds pride** in the home—**enhances** its value—**may be moved** if necessary—**keeps flies and vermin** away from food—is the **cheapest form of refrigeration**—the **safest**—the **quickest,** no matter what temperature the kitchen.

to

make yourself a reasonable surplus Sell

Electric Refrigerators

Sales Allies —

PUGET SOUND POWER & LIGHT CO.
PORTLAND GENERAL ELECTRIC CO.
WASHINGTON WATER POWER CO.

What to do—

Use the Thrift Idea

—the National Campaign

this year will feature the "Scotch Eskimo."

Worth your while tying-in with it, for it will be telling readers of the popular magazines that electric refrigeration—

1. **Costs less than any other kind,**
2. **Is the world's safest refrigeration,**
3. **That it gives adequate food protection regardless of room temperature,**
4. **Is the fastest method of refrigeration known.**

There's a food store tie-in that's a honey. It is designed to show housewives that electric refrigeration is what the stores she buys from depend on to protect the food before she gets it.

Envelope stuffers with the little character shown above, newspaper ads and mats, publicity photos and news releases, radio spot scripts, counter and window cards, and banners are all available to use for your own cash-in tie-in.

Use this material as well as that of your product.

You can sell electric refrigerators in spite of the prosperity of your town when you sell the **thrift idea.** An electric refrigerator is one appliance it is easy to prove that it actually **pays** to own and use.

U. S. Department of Labor estimates that 36% of average family income is spent for food. Perishables — meats, fish, dairy products, vegetables, fruits—make up 73% of the food supply. About 20% of it spoils.

Seven ways to save with electric refrigeration will cut that spoilage and make it pay for the refrigerator. These seven ways are:

1. **Quantity buying—larger sizes or quantities.**
2. **Waste from spoilage reduced.**
3. **Bargains in food can be stored safely.**
4. **Expensive last minute shopping unnecessary.**
5. **Left-overs can be made into appetizing dishes.**
6. **Children's lunch spreads can be made up.**
7. **Home made desserts at less expense.**

To make these savings really talk, work up a few examples from food ads in your own town.

Take canned goods. Show the price of the No. 1 can of 16 oz. as against the No. 2½ can of 29 oz. Show how a special on canned goods will save a few cents more. The refrigerator will store the surplus safely. **Meat specials** show the same savings. Put down the regular price, the special price, and the percentage of saving per pound. It is convincing testimony. **Cream savings** are spectacular. Price by the quart as against by the half pint—with the refrigerator keeping it fresh until wanted.

A salesman or dealer who uses such proof material as this, right from the local grocery price list, is talking language the prospect understands and appreciates.

Supported by testimony of users who are making such savings, with operating cost records, this is the strongest kind of sales proof.

Stop to think—a customer likes to feel justified in making such an important buy as a refrigerator. Such proof as this more than justifies the purchase—and makes you a sale that stays sold.

—and How

Sales Shorts

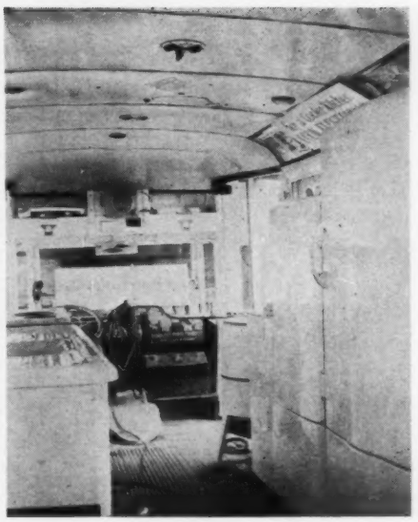
Display contest; utility merchandising; restaurants, etc.

HOW VALUABLE it is for a utility to promote appliances through window display contests is proved by Puget Sound Power & Light's experience. In order to sell a three-months' quota of 14,000 IES lamps, the company recently urged dealers to participate in such a contest offering $420 in cash prizes. When the campaign ended, it was found that 20,364 lamps—145.5% of quota—had been sold. These represented a sales volume of $225,000.

AT THE REQUEST of electrical dealers in the Inland Empire, Washington Water Power Co. will once more resume the merchandising of laundry equipment throughout its territory. This type of selling has been discontinued for the past several years. According to the dealers, washer and ironer sales have fallen off so badly of late, largely because of the absence of utility promotion, that participation is welcomed.

IT PAYS to own an all-electric restaurant in Los Angeles. The Electrical Development League of Southern California has sent out a letter urging members to patronize an all-electric tea room in Westwood Village. "Not only will you be doing yourself a good turn by enjoying wonderful food, prepared electrically," says the latter, "but you will be contributing materially to the advancement of flameless cooking."

CONFERENCE SALES training classes, especially designed by the Electric Appliance Society of Northern California for experienced salesmen, are under way in earnest in the San Francisco Bay region. Ferris M. Wakeley is director and conference leader. The conference method consists of pooling sales experience and ideas of all participants, sifting the information and organizing it so that the class members may each benefit from the total experience of the group. Registration fee is $3, of which the salesman pays $2, his firm $1. This entitles him to the summary material developed from the conference study. Approximately 400 salesmen have enrolled.



Taking the store to the customer has always been a good idea in farm communities. The meat man makes regular rounds; so does the gasoline truck. Now A. A. Soderberg, of Biola, Calif., is doing it too. After buying an old bus, he had J. U. Berry, of Valley Electrical Supply Co., help him fit it out with an electric range, water heater, sink, a couple of refrigerators, a washing machine, lamps, small appliances and catalogs. With a long cord he can attach the exhibit to the farmer's wiring and demonstrate

APPLIANCE SALES REPORT, 1939

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		L. A. Bureau of P. & Lt.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Power[6]		Southern Calif. Edison Co., Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.[9]	
	Current	2 Mos.	†Current	†2 Mos.	†Current	†2 Mos.	*Current	*1 Mo.	†Current	†2 Mos.	Current	2 Mos.	†Current	†1 Mo.	†Current	†2 Mo.	†Current	†2 Mo.
Ranges	149	250			71	130	252	252			110	212	164	164			110	251
Water Heaters	57	92			3	11	207	207			47	120	56	56			48	117
Air Heaters, aux.	74	125					844	844			29	95	378	378			101	253
Air Heaters, 220							109	109			50	130						
Refrigerators	165	256			265	514	2,389	2,389			155	326	1,669	1,669			238	516
Dishwashers	1	2					8	8			3	4						
Washers	377	784			485	900	2,489	2,489			178	396	2,031	2,031			339	649
Ironers	48	106			49	100	492	492			24	55	280	280			25	55
Vacuum Cleaners	111	224			187	354	2,774	2,774			56	169	1,209	1,209			248	429
Radios	686	1,494			1,179	2,664	9,448	9,448			444	969	4,673	4,673			1,379	2,642
Mixers	39	100					306	306			35	106	382	382			86	244
Cookers, Casseroles	24	39									23	55	162	162			179	388
Irons	380	715									185	459	1,123	1,123			463	1,022
Waffle Irons	138	245									64	213	454	454			121	283
Toasters	147	329									99	276	599	599			298	666
Table Stoves	136	263									50	139	229	229			73	253
Heating Pads	78	201									41	139	357	357			108	218
Curling Irons													44	44				
Coffee Makers	171	315									102	330	272	272			296	666
Sewing Machines							415	415									73	127
Clocks	94	227									117	358	589	589			172	345
Fans	12	22									2	3	14	14			22	49
Floor Polishers																		
Sun Lamps	38	61											62	62			11	27
Reflector Lamps	267	652									191	354					1,231	2,395
Miscellaneous Lamps	532	763			636	1,867											664	1,484
Yard Lights											39	75						
Misc. Small Appl.					1,347	2,957					67	251					44	114

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.

[3] Combined dealer and company sales from report of Montana Power Co. ‡ Does not include dealer figures for two divisions for January and February, 1938.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. *Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.

[7] Includes reports from dealers on San Joaqin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

[9] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.

† February figures were not available at time of going to press.

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

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Oregon's PUD Law

OREGON has just passed an amazing public utility district act, briefly described in a news item in this issue. The bill is amazing in that calm and deliberate legislative procedure has produced a piece of legislation that places the operation of public utility districts on a sound and businesslike basis. Heretofore in similar legislative undertakings emotional rather than common sense arguments have dictated the provisions of such laws with sorry results.

Essence of the Oregon bill is that revenue bonds may be voted for financing acquisitions of utility property if they are voted by a majority of the electorate in an election in which at least 25 per cent of the voters exercise their franchise. Furthermore, it provides that district utility property shall be subject to the same property tax as would be paid if the facilities were privately-owned.

Of course a howl has gone up from the dyed-in-the-wool public power proponents. These people were seeking a law which would give utility district directors the power to act in matters of financing without possibility of public veto. They also wanted a subsidy by relief from taxes. In short, they wanted a political dictatorship and a headstart on private utility systems which would make easy an apparent showing in favor of public operation.

But the sane folk of the state countered by saying, "Yes, we should have a means for the people to go into the power business if they elect to do so, but the device provided for this purpose should protect the people at large from the mistakes of the incompetent or the machinations of the unscrupulous. Further, our schools and other really necessary public enterprises should be protected against the loss of tax income."

While the bill was being debated in the legislature, a Department of Interior press release from the Bonneville project condemned the measure by quoting the acting administrator as saying, "Our attorneys, our engineers, our financial experts all agree that this bill is worse than no bill at all, that it will hinder rather than help public districts seeking to sell Bonneville power at cost . . . Administrator Ross repeatedly has said that Oregon needs a workable revenue bond law that will permit power to stand on its own feet."

One wonders if sound financing and equitable taxation in the power business are not part of the process of "standing on one's own feet." The Bonneville Act gives public districts preferential rights to the purchase of Bonneville power, but careful reading of it reveals no statement or implication that public agencies should be set up on an unsound or imprudent basis. Further, one wonders why a federal agency feels it necessary to dictate to a sovereign state how it shall legislate on a purely intra-state matter which involves no conflict with the federal constitution.

World's Fair Lighting

"COLOR is perhaps the most distinguishing feature of the exposition at San Francisco. The soft travertine shades produce a harmony most pleasing to the eye. That this feature should be maintained and even intensified at night, not only by the flood lighting of colored facades, but also by the iridescent gleam from the jewel-studded towers, turrets and statuary is due to the creative genius of the illuminating engineer."

In these words the *Journal of Electricity* eulogized the genius of D'Arcy Ryan back in 1915 for his masterful application of light to the Panama Pacific International Exposition. His creation was the outstanding characteristic of the show.

What should be more natural then that the lighting should be the most conspicuous and noteworthy feature of the Golden Gate International Exposition in 1939? For certainly such is the case. Ask any visitor to name in order the most impressive elements of a visit to Treasure Island and the universal answer is (1) lighting; (2) architecture and landscaping, and (3) setting.

Descriptions of the island at night exhaust adjectives and synonyms alike. "Fairyland," "a painting by a great master done in light," "color symphony," "prismatic wonderland" are just a few that one hears when the beauty and grandeur of the illumination is the subject of discussion.

Merited congratulations are due A. F. Dickerson who supervised the design and layout of the G.G.I.E. lighting, as well as to his associates in the General Electric illumination engineering laboratories. The most expressive compliment that can be paid this group is that of an oldtime electrical man whose mind was filled with doubt until he visited Treasure Island: "It's even better than 1915."

Accepting the Challenge

DESTINY has a way of setting its own quotas for men to make. These goals sometimes appear insurmountable — the forbidding walls of Black Canyon on the Colorado, the unknown depths of San Francisco Bay, and now the markets for the great volumes of electric energy —all have seemed so in their turn.

With the courageous words of Franklin T. Griffith to inspire them, the challenge of the Northwest's great surplus of power was accepted by the men and women of the Northwest Electric Light & Power Assn. at the Business Development Section meeting in Portland last month.

"As we have met the pioneer needs of this region for electricity and given the nation's lowest cost service, let us meet the new pioneering need to put to useful work the great supply of power now made available to this region by the Federal government. Let us prove to the public our superior training and experience to perform this public trust." This in essence was the acceptance of the challenge.

Meanwhile the realities of this problem are becoming better known to the public. Sober wonder over the effect of changing managements of a vital service is being expressed. The wisdom of sacrificing the tax revenues and business health of the communities to the no longer glamorous ideal of "public power" has caused the legislatures of Washington and Oregon to think seriously.

There is evidence of a returned feeling on the part of the now disillusioned public that business enterprises are best run by business-trained men, and not by idealists. Such an awakening gives some promise that the electrical industry may be allowed to go to work to sell the superabundant crops of kilowatts being grown at public expense for markets that have yet to be developed.

At least the industry is determined to prove worthy of this new responsibility. It is asking for the order. It accepts Destiny's quota and is willing to go to work on it.

Obsolete Construction

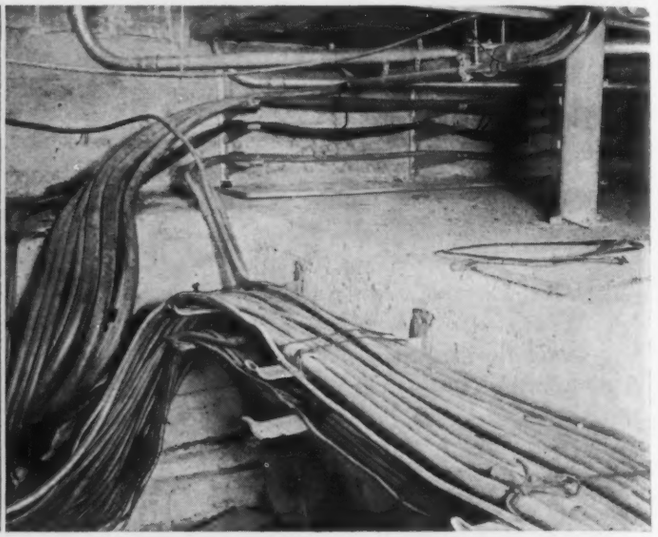
IT TOOK the analytical eye of an engineer-banker to discover what perhaps is the fundamental weakness of the construction industry. The occasion was a meeting of the Construction Industry Section of San Francisco Chamber of Commerce. The speaker was quiet, penetrating Francis T. Letchfield, engineer and officer of Wells Fargo bank. He was talking of the courage to face obsolescence as the index of an industry's progressiveness.

What Mr. Letchfield did say was that there is not a house now built anywhere but that is technically obsolete, even if finished only yesterday. What he did not say, but what any shrewd observer might have read into his understatements, was that the methods of the construction industry themselves are so obsolete as to be almost medieval.

Those two great industries, the automobile and the chemical, he pointed out, have courageously faced the problem of obsolescence. In Europe, he said, the business man still wonders why Americans discard an old machine or process the minute a better, easier new one is found. Europeans hold that we Americans mechanize to reduce labor, completely missing the point that the reason we mechanize in America is so that we can pay high wages and uphold a high standard of living and a consequent buying power that can consume more. Where obsolescence is recognized and dealt with by an industry there is a real contribution to the American public in lower prices, wider distribution and greater refinements. Even the public is obsolescence-minded, for it buys new cars when it considers the one owned has become uneconomical to run in view of the newer models offered.

In the building of homes, when it is realized that manufacture is performed at the site, in the most costly hand-craft fashion that has not changed since pioneer times, without benefit of shop organization or machine tools or modern assembly processes such as welding, it is no wonder housing costs so much and that so many dilapidated, shabby old houses continue to stand and be occupied.

Perhaps organization of the construction industry will hasten the realization that to rid America of obsolete homes and buildings will require a mental housecleaning to rid the construction industry of obsolete construction methods. With the materials made available today from modern processes, plus the methods modern technology can supply to assemble them, certainly houses can be prefabricated in room units and assembled, rather than manufactured at the site, with something of the same economy that results in low cost yet luxurious transportation to Americans. This will start a building boom that will pale past booms. Along with it the electrical industry will profit.



Duplicate electrical facilities are maintained by Associated Oil—Figs. 1 and 2

Continuity

How Associated Oil works to maintain service

Continuity of service is so all-important to an oil refinery that Tidewater Associated Oil takes no chances of an outage. So coordinated are the various stages of cracking and distilling crude oils to derive gasoline that a momentary shutdown of any of the auxiliary electrical equipment would not only be costly but in many cases dangerous.

Another characteristic of oil-company operation is that of making changes in order to use new equipment and new processes. Thus the entire electrical installation must be kept exceedingly flexible and subject to quick alterations.

It's logical, therefore, that N. A. DeLew, electrical engineer for the company, insists that his equipment must at all times meet this requirement of flexibility.

Recently a number of new switching stations were installed at Associated's Avon, Calif., refinery by Pacific Electric Motor Co. These stations illustrate how a duplicate set of facilities are maintained for every piece of equipment.

Fig. 1 shows the interior of one of the switching houses with all switches and contactors duplicated on either side of the building. The floor is made of sections of heavy planking, each one loose and removable. This gives access to the feeder cables which are run on racks (Fig. 2) directly beneath the floor.

Motor equipment near the stills is remotely controlled from push-button stations which operate through the automatic switching equipment shown in these pictures. The cables are lead-covered and enter the switch house from the underground box at the lower left, branching out to the racks on either side of the building and feeding directly from the equipment above the floor as in Fig. 1.

Location of the transformers is interesting. In Fig. 3 the transformer banks, again in duplicate, are shown on the roof of the building with the two service entrances.

Motor Display

A downtown window promotes Frank Andrews' business

Most motor dealers and repair shops are content to let business find its way to them. They reason—and on the surface, it's logical—that motor and magneto works seldom have much in the way of sales appeal. Furthermore, their plant is usually off the main street in the industrial district where window displays of anything except motors and control equipment are practically worthless.

There is one man in Modesto, Calif., who rebels at this idea, however. He's Frank Andrews.

Andrews appreciates that you must interpret the motor business to the public in order to make its value apparent. Consequently, he rents a good vacant show window in the downtown shopping district in which to display his equipment and tell his story.

"How many people know what you have in your shop?" he says. "Not many. So show them. Always make up some moving equipment with colored lights to attract attention. Then people will look over the rest of the window. Use pictures of many of the jobs you have done. If you work for industrial plants, display pictures of the exterior and interior. After all, the electrical man can always work up novel stunts which will start the town talking about his business."

Another interesting bit of Andrews' philosophy he expresses thus: "Go through your trade magazines and you will find many interesting pictures of projects close to the home town. Use these. People will read them. It shows that you keep abreast of the times."

To illustrate this belief, he has placed on display copies of ELECTRICAL WEST, *Electrical Contracting*, *Electrical World* and *Factory Management and Maintenance*. On an automatic slide machine above, he shows "To keep abreast of the times, we take many trade papers." There follows a list of these magazines.

Andrews merchandises this show window by mail. He has had a post card made up with two photographs of the window, over which is typed the name of his firm and the list of equipment on display. This card he sends

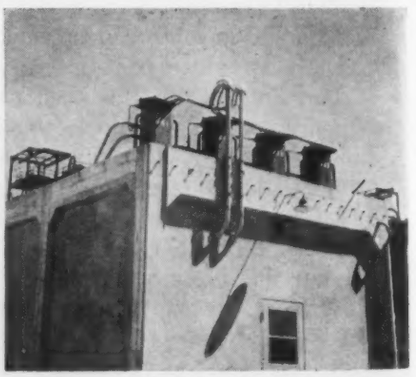
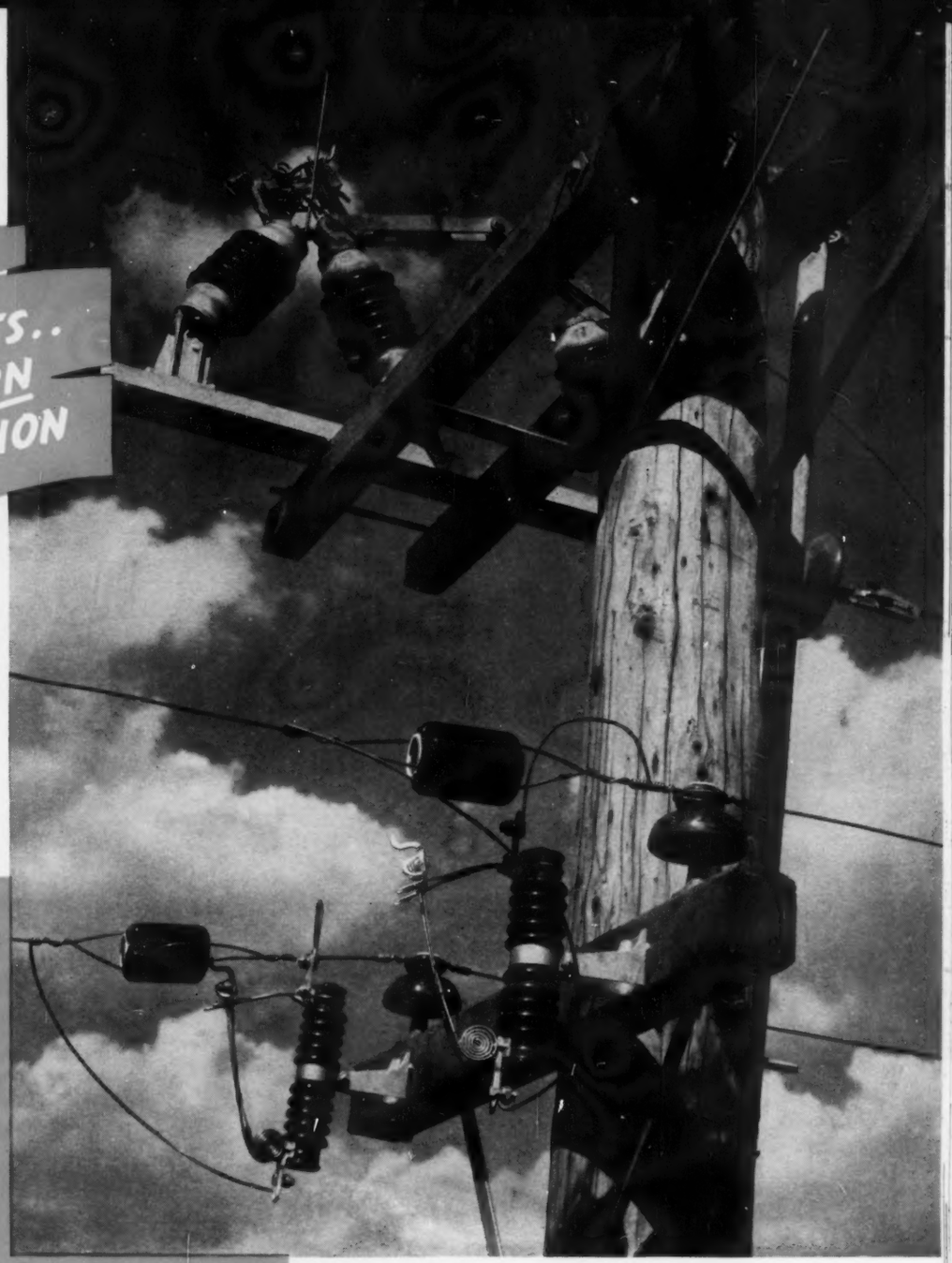


Fig. 3—Associated's transformers

SPECIFY STATION POSTS.. IT'S MODERN CONSTRUCTION



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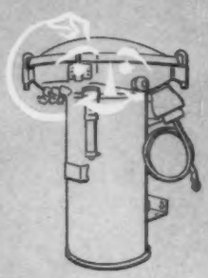
C·S·P THINKS · TALKS · ACTS

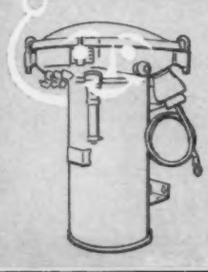


THINKS

C·S·P's protection against burnouts is selective. It permits any overload that does not exceed critical winding temperature. Permits use of excess transformer capacity and reduces maintenance expense.

TALKS

But C·S·P *tells* you when an overload condition exists. The overload signal light talks. It anticipates a service interruption and eliminates costly load surveys.



ACTS

If the temperature reaches dangerous proportions, or if a short circuit occurs, C·S·P *acts.* Its built-in breaker works automatically, to protect the transformer. Service is quickly restored by resetting — a one minute job that can be done from the ground.

...AND GIVES YOU THESE *EXTRA* ADVANTAGES

Think of the savings that come from cutting fuse outages 100% (no fuses with C·S·P), and from reducing maintenance to a few **pennies** per year per transformer. And don't overlook a saving in installation cost up to $7.50 per transformer, due to C·S·P's one-piece design.

Only C·S·P Transformers are . . .

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Westinghouse Transformers

to 150 industrial plants and establishments in the Modesto area.

Result of all this promotion work is to be expected: Andrews is bringing a lot of work to his shop.

Mexican Art

The Gilbert Craftsmen incorporate it in lighting fixtures

By JAMES RUSSELL GUILD
Albuquerque Gas & Electric Co.

Fifteen hundred hand-made lighting fixtures and lamps for the ten-story Hilton Hotel now under construction in Albuquerque, N. M.—that's a part of the order recently placed with Walter B. Gilbert Craftsmen, Albuquerque designers and producers of native-craft wrought iron and Mexican-tin work. Bridge lamps, bed lamps, desk lamps, wall sconces, candelabra, indirect-light wall and ceiling fixtures and chandeliers are among the items listed. All are of original design; all made from wrought iron, tin, antique glass and goatskin in attractive combinations.

Sensing the appeal of Mexican craftmanship in these crude materials 12 yr. ago, Gilbert, then a more or less obscure electrical contractor, began in a modest way to capitalize on his creative ability. With handsome adapta-

A couple of the Gilbert craftsmen at work on a motley assortment of lamps

tions of designs, patterns and methods which had their origin among the Franciscan Friars at the time of their early missionary visitations to the Southwest, he quickly won local approval and prestige. Preserving with authentic exactness the salient characteristics of the native craftsman's work, Gilbert has modernized the product of an era which left a definite imprint on the Southwest—an era of romance and of conquest, during which a prized architectural heritage was under development.

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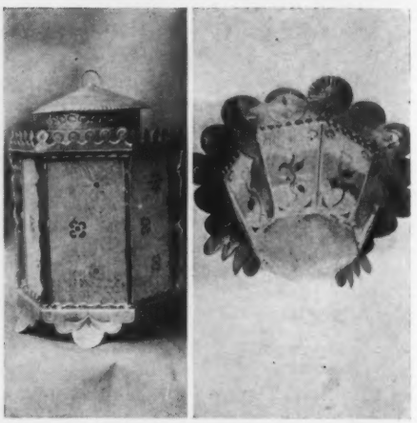
Two Mexican art-craft table lamps

the early Mexican artisan was, by virtue of the limitations of his tools and material, crude indeed. A few simple dies, a punch or two and a rough cutting implement together with a home-made forge comprised his equipment. Tin, copper in limited quantities, iron and sheep or goat hides constituted his available material resources. In addition, he achieved a few basic paint colors by the mixture of oil with natural pigment elements such as iron oxide for red, ochre for yellow and certain clays for blue.

Adhering closely to tradition, the Gilbert craftsmen, in whose families the art has been handed down for generations, are similarly equipped — but with the advantages of up-to-date mechanical facilities as well. Conversion of the candlestick or candelabrum of antique design into a modern electric lamp, transformation of the Spanish colonial wall sconce into an attractive wall bracket, adaptation of the hand lantern of yesteryear to effective use as a modern ceiling fixture giving softly diffused indirect light—these are the achievements of this modern renaissance.

Historically authentic, architecturally sound and scientifically measuring up to IES standards, Gilbert's products have made for themselves a definitely popular place in Southwestern homes and public buildings. Of the latter, perhaps the most outstanding is La Fonda Hotel in Santa Fe, famed hostelry of the Fred Harvey System. Numerous theatres, hotels, school and university buildings, hospital and government agencies in New Mexico, Arizona and Colorado have been equipped with Gilbert-made fixtures, while shipments are frequently made to California and other states.



A Gilbert lantern for porch or outdoor use and an ornate ceiling light

Time Control

Is supplied for Riverside Water's pumping plants

To provide time control of water-pumping plants and thus make them semi-automatic, A. A. Webb, engineer of Riverside (Calif.) Water Co., has developed a plan for both new plants and existing equipment.

The company supplies irrigation water to an agricultural region by means of some 20 mi. of canals. It obtains its water by pumping from river-bottom wells.

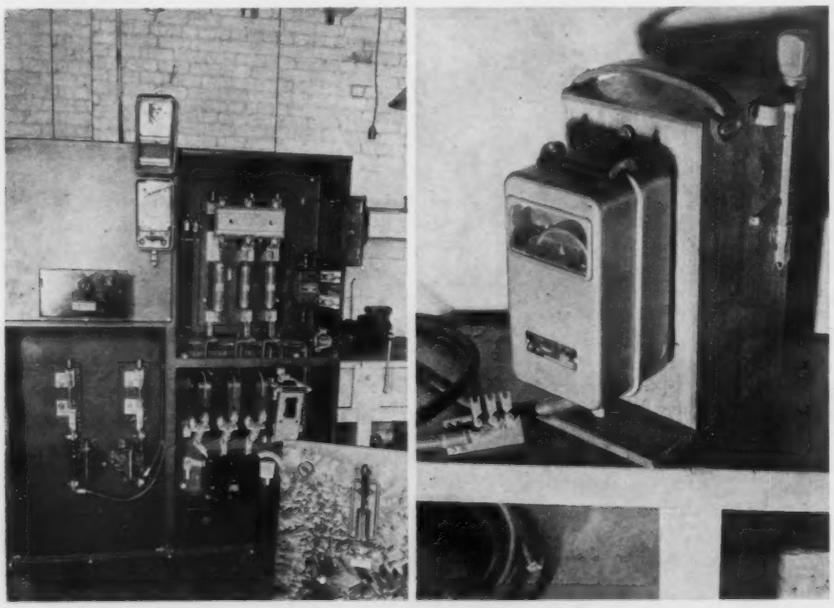
The time to start the plants is determined beforehand from subscribers' demands. These demands fluctuate, a good many calls coming during the night. With 24-hr. notice, the company dispatched a man to set the required pumping plant in operation and, at the end of the stipulated period, to turn the plant off. Before the semi-automatic operation was installed, this system kept attendants on duty 24 hr. a day—a costly procedure.

Now whenever a new switch panel is put in, the time control is built on the panel (Fig. 1). The panel contains main fuses and contactors for the operation of a 150-hp. deep-well turbine pump. Located in the lower part of the cabinet are the current calls for the power company metering.

To make the cabinet over for automatic operation, Backstrand Bros. Electric Motor Shop, Riverside, installs one 440-volt and two 110-volt transformers, together with fuses and a time-delay relay to supply current for the automatic time clock. Nominally the panel is manually controlled. A transfer switch and a hold button are mounted in the front panel by which to transfer from manual to automatic control. The button is for holding in the circuit while the transfer is being made.

Since most of the pumps are water-lubricated, it is necessary to have a control on the water in order to provide lubrication before starting the pumps. This requires from 50 to 100 gal. A relay delays the starting of the motor until ample time has passed to allow water to fill the pumps. This is automatically provided in the control built into this unit.

For those jobs which are already installed, Backstrand Bros. built a portable time-clock device which can be plugged into the circuits of the existing control panels. This is made to start across the line's motor-equipped plants, or to turn off the plant which has been manually operated. Older types sometimes have belt-operated pumps and motors equipped with compensators. In such cases, the portable



Riverside Water Co.'s equipment—Figs. 1 and 2

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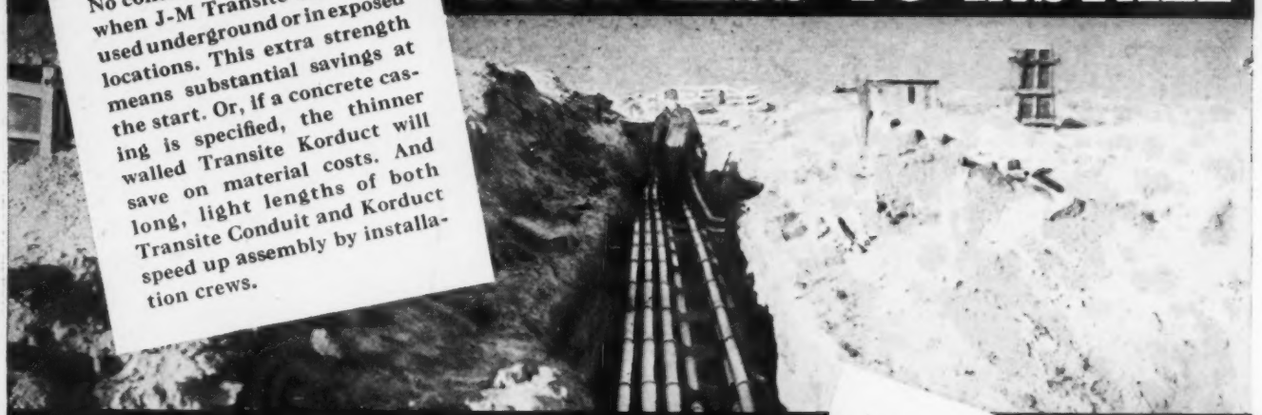

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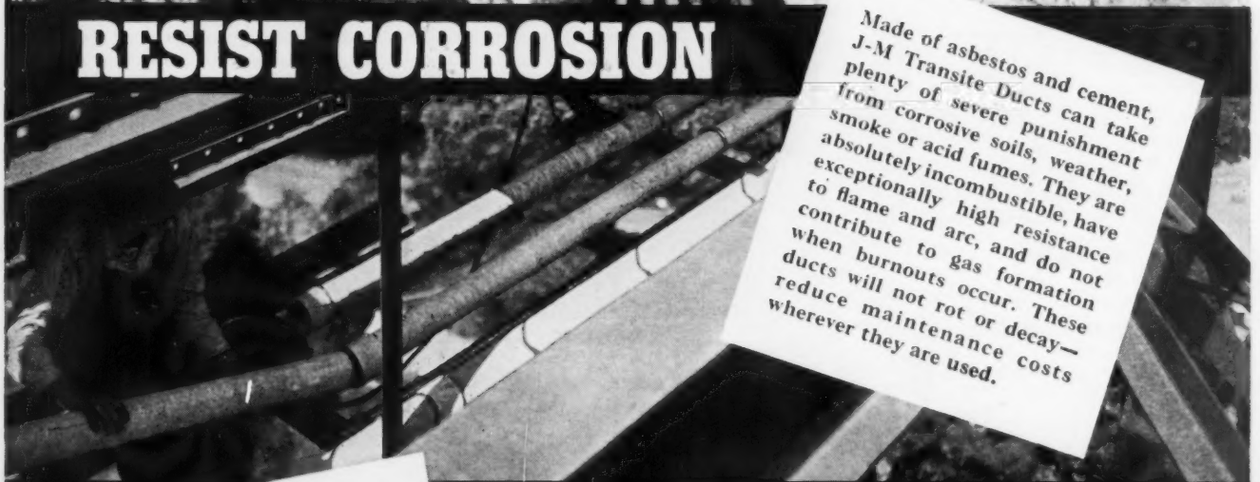

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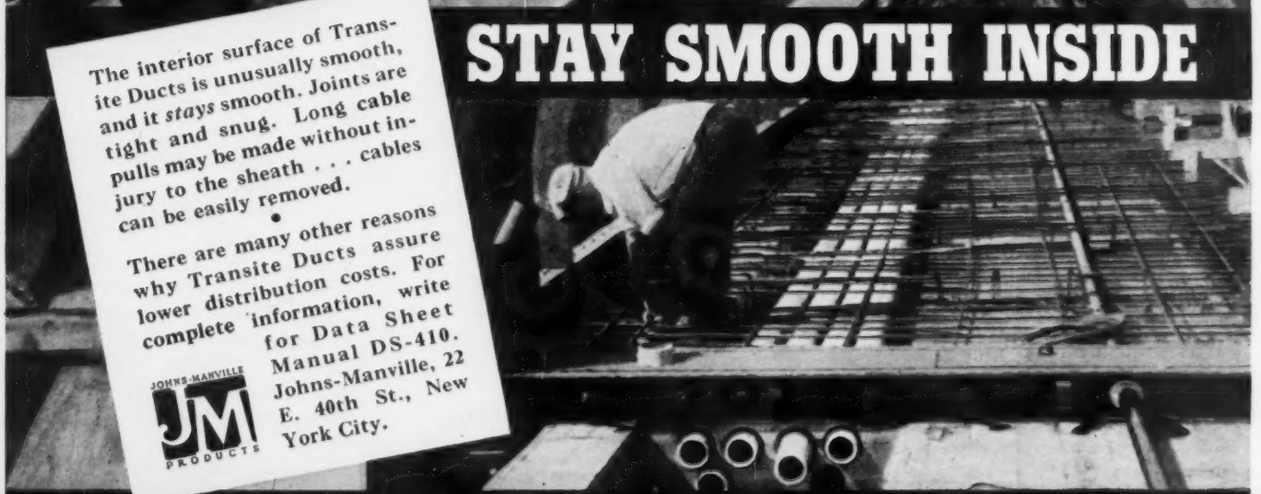

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Hollywood plus Earl Carroll (he of the beautiful women) equals this—the Earl Carroll Theater-Restaurant. Light itself, rather than the conventional illumination of paintings, statues, etc., is the decorative medium. Tube lighting is used throughout. In the foyer a 50-ft. Zeon tube, the largest unsupported single tube light in existence, it's said, winds its way upward to a black patent-leather ceiling (left). Then begins a series of light tubes in the form of a luminous fringe, pendant from the ceiling, sweeping in graceful curves across the restaurant to a 30-ft. column of light adjacent to the stage (above). There are 1,200 of these pendant tubes—a total of 6,200 ft.

rig breaks the circuit in the holding coil at the required time and turns off the electricity.

In a handy mahogany box (Fig. 2), on the outside of which is mounted the time switch, are a transformer, relay and a length of cable by which to connect the rig to a connecting block with which the permanent panels are equipped. Strapped along the side of the portable rig is a fibre jack used to make the change-over or transfer from manual to time-switch operation.

Terminal Lighting

An unbroken ceiling line requires special fixtures

Very low ceilings in the concourses and waiting rooms of the Terminal Bldg. for San Francisco Bay Bridge trains, and the desire of architects to maintain an unbroken ceiling line required unusual lighting treatment in order to obtain satisfactory results. G. M. Simonson, electrical engineer and Sam Radelfinger, contractor, cracked the problem, however.

In the concourse and waiting rooms a lighting intensity of from 10 to 21 ft.-candles was obtained by mounting 150-watt, specially constructed holophane units, equipped with 12-in. control-lens plates, on 12½- to 14½-ft. centers. These are flush with the ceiling, as the architects required.

This demand—that the lighting unit be inconspicuous and should not protrude below the ceiling surface—naturally increased the difficulty of obtaining a high uniformity of lighting; but this factor was waived in favor of the utilitarian ceiling surfaces. As it is designed, the lighting provides high utilization of wattage, higher efficiency, more permanence in the installation and a high resistance to depreciation. Under the marquee at the entrance, 25 ft.-candles are obtained in the same manner.

In the head house, four 200-watt recessed units with lens equipment give 8 ft.-candles. Under the arcade, the sidewalks are lighted by vapor-proof 200-watt units of a strictly utilitarian type.

Throughout the building some units are on emergency circuits.

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"SEE G-E!" That's the hot-tip among refrigerator shoppers this year. The 1939 G-E is jam-packed with new value, new features, new conveniences. It has everything needed for thrifty, convenient, safe preservation of food, *and is priced lower than ever before.*

Here's Why G-E is the Great Value of the Year

1 Selective Air Conditions perfected at world's greatest electrical research laboratories.
2 Stainless steel super-freezer with removable shelf.
3 Fast freezing, easy releasing Quick-Trays.
4 Easily adjustable storage space, sliding shelves.
5 All-steel cabinet, one-piece porcelain interior.
6 Simple, quiet, sealed-in-steel Thrift Unit.
7 Forced-feed lubrication and Oil Cooling.
8 Enduring economy proved by 13-year record.
9 Thrifty in price, in current, in upkeep.

RESEARCH KEEPS G-E YEARS AHEAD!

From the famed G-E "House of Magic" came forced-feed lubrication, oil cooling, acoustic mufflers and "floating power." These advanced features of the G-E Thrift Unit assure quiet operation, low current cost and long life. General Electric Co., Specialty Appliance Div., Nela Park, Cleveland, O.

GENERAL ELECTRIC
Triple-Thrift REFRIGERATORS

Visit the Golden Gate International Exposition, painted with light by General Electric. See our G-E "House of Magic."

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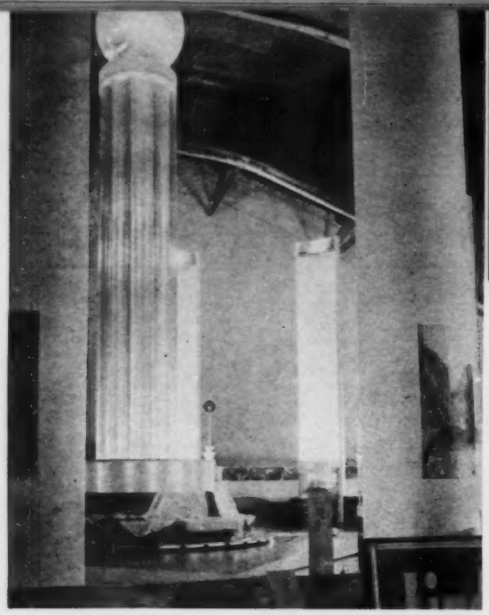
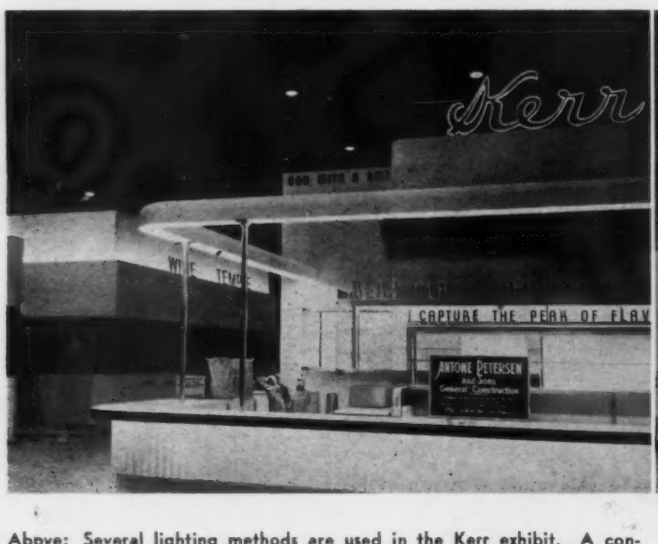


More IDEAS From the FAIR

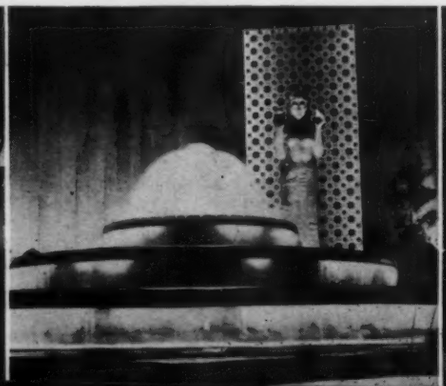
Above: Chrysler exhibit has 12 half-cylinder pylons at the base of which are 7 200-watt floods and 3 200-watt spots, behind grills, trained on the center revolving globe. This globe is atop a fluted pillar bathed in changing colors by 200-watt red, 500-watt green, 750-watt blue and 200-watt amber floods on a color mixer. Outlining the low step of the center circular seat are 60-watt lamps, concealed behind red Celloglass-covered niches, which throw a red glow along the floor. Below: The Wine Temple exhibit uses a simple lighting trough concealed behind a set-back to silhouette the letters on the front face of the outer wall. Above center: Revolving Polaroid screens bring continuous color change to the cellophane face of this electric clock

Above: Doubly interesting is the Floriculture building, housing rare plants and flowers. Both walls and roof are made like a latticed honeycomb, and covered with Celloglass. This is a severe test of the weather-resisting qualities of this translucent material, which its makers say should be used outdoors for much shorter periods than the duration of the Fair. It was used because it permits ultra-violet light to penetrate to the flowers and plants. Lighting is combined in the trough at the roof top—500-watt aluminum reflectors for down light, and broadsides of 200-watt reflector floods on 2-ft. centers directed through the port-holes along each side of the trough. Relamping is done from a cat-walk above the lighting trough (note ladder at right and hand-rails)

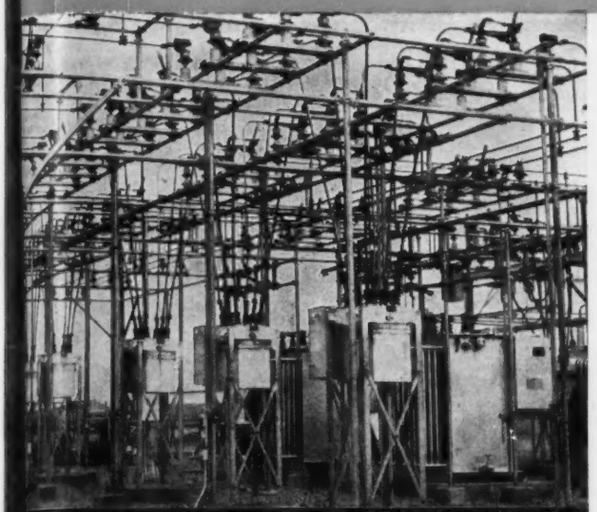


Above: Several lighting methods are used in the Kerr exhibit. A continuous glass-covered cove directs plenty of light down on the center. Under the counter is a concealed strip of lumiline which illuminates the face of the counter. At the rear, signs are silhouetted against luminous panels and a small floodlighted mural. Electric ranges are also used in the exhibit. Below: A novel and "functional" way to light a semi-circular mural—a spiral row of reflector flood lamps on a single steel pipe at the center of the arc. Use of concealed flush-mounted units with frosted-glass covers is seen almost everywhere in the Fair. One example is shown in the ceiling of the display piece in the foreground

Above: U. S. Steel employs several lighting techniques. One is this triangular luminous trough for lighting two poster panels, one on each side of each trough. In the background can be seen the angle reflectors housed in a dome to light the wall mural, "Research." A row of silver-necked reflector lamps lights another group of wall posters. Below center: The Lucite domes in the center of the fountain in the Court of Pacifica. Light is transmitted up through them to the water from a concealed light box below. Below right: General Motors makes extensive use of fluorescent lumiline lamps in floor standards of fluted steel, and in center pylons. Fluorescent tubing is also used in display pieces



WHICH Oil Circuit Breaker GIVES You More for Your Money!



SAVE SPACE AKE breakers installed in southern California

Get the Facts on How Scores of Utilities are Benefiting with Pacific Electric Breakers

TYPE AKE, 7.5 and 15 kv.

When you've checked facts on modern oil circuit breakers, you will positively know that Pacific Electric gives you MORE FOR YOUR MONEY. Yes, more benefits to you, more features, more sound engineering.

ROCK BOTTOM MAINTENANCE

You get big savings in maintenance because (1) you have low oil carbonization and less oil servicing for our Expulsion Arc Extinguishing Devices extinguish arcs quickly, (2) you save station space, (3) you have no oil throw, (4) you reduce arcing tip burning, (5) you have easy circuit testing, (6) you have no costly delicate adjustments as with poorly-designed breakers, (7) you have certain synchronizing, and (8) you have low first cost.

Yet *all of this is only part of what you get*—because Pacific Electric engineers "went to town," found out what you want and built these breakers with *extra value* for giving you the lowest operating costs.

Yes, POSITIVE FAULT PROTECTION

You owe it to your company to get the full facts right away. See the full proof of why P. E. breakers offer fast, certain operation when shorts occur.

Our reliable control mechanism plus our Expulsion Arc Extinguishing Devices which reduce arcs, *permit* fast opening and reclosing of circuits.

Here is the sure combination of tested designs that work perfectly to save your money, keep pay loads bringing in more revenue! Get the facts. Weigh the *extra benefits* for you.

SURE CONTROL MECHANISM, NO COSTLY WIRING

r fast, dependable operan, you use either the ring-actuated Motor-Wound Hand-Operated Control echanism.

Motor Control has proved best for utomatic reclosing with either imediate or delayed first reclosures with time delay for second and third. Operates on AC or DC.

Manual Control trips breaker automatically but must be closed by hand. Both factory mounted on breaker to save you space and money.

ALL THIS WITH SAFETY

uch sound design *assures* afety. You have no oil throw, no flame, no measurable stresses.

Operators have confidence around P. E. breakers because of their fast fault clearance, rapid arc extinguishing and positive operation.

Take a look at full facts. Write today and you will know you can rely upon this sound design, precision construction for safe operation.

Saves INSTALLATION COSTS

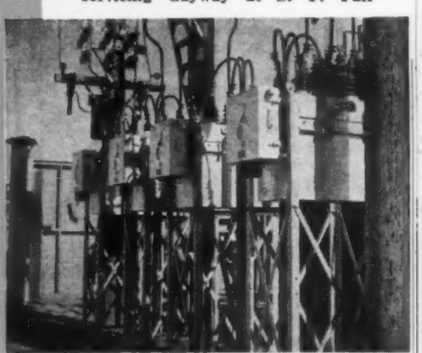
- **NO COSTLY ASSEMBLY**
- **NO COSTLY FIELD ADJUSTMENTS**
- **NO EXPENSIVE OPERATING POWER SUPPLY**

See what you save on Pacific Electric breakers because we ship breaker factory assembled and tested. You have no costly assembly, no costly field adjustments as with cheaply-built breakers.

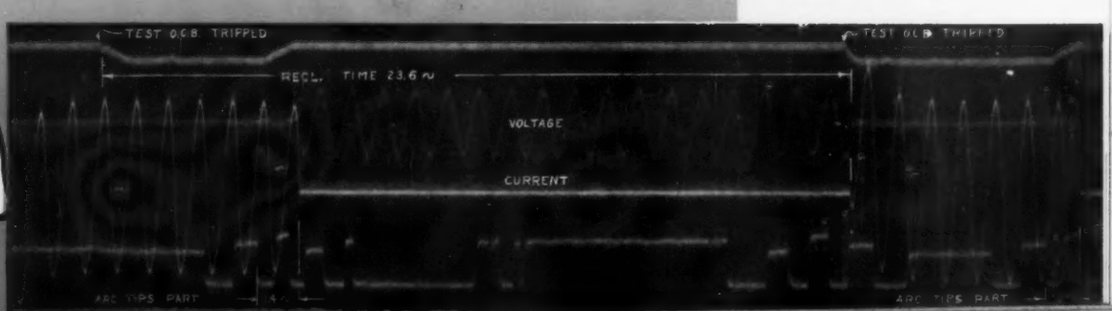
Then consider the Motor Control with its low-current requirements from *small* batteries or AC without rectifiers. All these, plus specified relay panels or accessories, are factory mounted on breaker to save you money. Get Bulletin No. 63 *now*.

ALL THIS SOUND ENGINEERING ASSURES YOU OF A BETTER BUY!

Four Pacific Electric Type AKE breakers in 4000 kva. substation servicing Gayway at S. F. Fair



OSCILLOGRAM TELLS STORY OF LESS OUTAGE TIME — actual short-circuit test, Type AKE-25, one pole across line, current 4000 a.; v., 4.76 kv. Get full test report.



Pacific Electric Mfg. Corporation

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Representatives in Principal Cities

NEWS OF THE INDUSTRY

OREGON ENACTS PUD LAW; WASHINGTON BILL KILLED

Enacted last month by Oregon legislators was a new public utility district law providing for issuance of revenue bonds on a vote of the people of the district and for taxation of utility property of the district on the same basis as utility property of private companies.

The bill was the result of long drawn-out committee deliberation and floor debate in which public-power zealots who sought to make the financing of utility districts easier met firm resistance from the more conservative block of the legislature and the governor.

Under the new law, revenue bonds may be issued for financing acquisition of properties only after a majority vote of the district's electors, if at least 25% of the total electors vote at the bond election. Bonds may not carry more than 6% interest and must be sold to the highest bidder after advertising for bids and at not less than 98. Public-power proponents attempted to have these bonds issued at the will of the directors of the district only and to permit their sale privately.

County and state taxes are to be imposed on the utility property of the district on the same basis as such property would be taxed if it were owned by private corporations. Districts themselves may levy taxes on all property in the district to the extent of 10 mills within ten years, and not to exceed 2 mills for any one year. Further, provision is made for district dissolution if the district has remained inactive for a continuous period of ten years.

District commissioners are enjoined to establish rates for power which will meet operating costs and taxes as well as debt service and all obligations. With respect to the revenue bonds, only that part of a district's revenue remaining after operating expenses, maintenance and taxes may be used for bond service.

In the Washington legislature, a bill somewhat similar to the Oregon law was stalemated when it was passed by the senate but died in a house committee. Thus Washington's PUD law remains in status quo.

POURING CONCRETE for Seattle's $5,630,000 Ruby Dam on the Skagit River was officially started Feb. 21. Pouring operations under the present contract will continue for approximately a year.

BATTLE over San Francisco's disposal of Hetch Hetchy power through an agency agreement with Pacific Gas and Electric Co. entered a new phase last month when the government filed a brief with the U. S. Circuit Court of Appeals. Outstanding arguments of federal attorneys were much the same as those brought before Federal Judge Roche, who ruled last year that the city was violating the Raker Act.

PUBLIC SERVICE CO. TO BUY CASPER-ALCOVA POWER

Contract for the annual delivery of 40,000,000 kw.-hr. of Casper-Alcova power into Public Service Co. of Colorado's system at Greeley, Colo., and Cheyenne, Wyo., has been signed by the company and the U. S. Bureau of Reclamation.

The power is sold on a dump basis at a rate of 1.8 mills per kw.-hr., the approximate increment cost of coal at the Public Service steam plant at Valmont.

Delivery will be made over the 205-mi., 110-kv. transmission line being constructed by the Bureau of Reclamation from the Casper-Alcova plant eastward into Nebraska, where a tie is to be made with the North Platte development.

ARIZONA CONDITIONALLY RATIFIES COLORADO COMPACT

Conditionally ratified last month by the Arizona legislature was the Colorado River or Santa Fe Compact for apportionment of Colorado River water between the upper and lower basin states.

The condition is that a tri-state agreement be concluded between California, Nevada and Arizona for apportionment of the lower basin's share of the river's flow.

Drawn up in 1922 at Santa Fe, N. M., the compact was subsequently ratified by all seven participating states except Arizona. Under its terms, 7,500,000 acre-ft. of water per year is allotted to Wyoming, Colorado, Utah and New Mexico, the states above Lee Ferry, and 8,500,000 acre-ft. to Nevada, California and Arizona below Lee Ferry. Provision was made for the future apportionment of any surplus water. All rights in water stored by Boulder Dam were later made subject to this compact by the Boulder Canyon Act.

J. D. ROSS DIES; NEW BONNEVILLE HEAD SOUGHT

Uncertainty shrouded the future policies and administration of the Bonneville project last month as a result of the sudden death of Administrator J. D. Ross.

The administrator, who was also superintendent of Seattle City Light, died March 14 at the Mayo Clinic, Rochester, Minn. Successfully withstanding an operation, Feb. 3, for "intestinal lesion," Mr. Ross, 66, was said to be recovering rapidly when a heart attack proved fatal.

Since no word was immediately forthcoming from Washington as to who would succeed Mr. Ross in his Bonneville post, speculation in the Northwest raged unchecked.

Charles E. Carey, principal construction engineer, who had been acting administrator during Mr. Ross' convalescence was reaffirmed as acting administrator. But Portland sources maintained that he would not accept the job as head, even though it were offered him.

It was generally assumed that the new appointment would be political. Prominently mentioned was Dr. Clarke H. Foreman, head of the PWA power division. Washington authorities maintained that, had Mr. Ross refused the Bonneville appointment when it was offered him in 1937, Foreman would have been given the job.

Others who were mentioned to succeed Mr. Ross were David Lilienthal, of TVA; Benjamin H. Kizer, of Spokane, a member of the Pacific Northwest Regional Planning Commission; George Yantis, of Olympia, Wash., chairman of the planning commission; Robert W. Beck, Bonneville valuation expert; James H. Rowe, of the White House secretariat; Mrs. Nan Wood Honeyman, former member of Congress, and Ray W. Gill, master of the Oregon State Grange.

Whoever the ultimate choice is, Northwest authorities were firm in their belief that President Roosevelt, a good friend of Mr. Ross, would play a heavy hand in it.

Meanwhile, in Seattle, there was also discussion of whom Mayor Langlie would name to succeed Mr. Ross as City Light superintendent. Most frequently mentioned were W. C. Morse, city water superintendent; W. J. McKeen, acting City Light superintendent; Glen H. Smith, City Light engineer, and Isaac

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Represent-ing a completely new achievement in Ceramic Engineering

THOMAS "Q-T" INSULATORS set the standards for 1939

(Patents Pending)

FOR ELIMINATING RADIO INTERFERENCE

Positive Protection Guaranteed

The "THOMAS PROCESS" of eliminating radio noise from insulators consists of a specially prepared combination of metallic oxides applied — *prior to the glazing of the porcelain* — to certain critical areas of the unglazed clay body before "firing." Thus a thin film of metallic oxides is ceramically bonded in these areas to both porcelain body and glaze which acts to damp out radio noise effects through the resistance of the metallic oxides "coating." The electrostatic flux density is reduced at these areas to such an extent that corona is eliminated or reduced and the cause of radio disturbance from insulators is eliminated.

Permanent Protection Guaranteed

This completely new and exclusive "THOMAS PROCESS" offers permanent protection from radio disturbance because the metallic oxides "coating" is fully protected from all atmospheric, climatic and weather conditions by a layer of smooth glaze. Fundamental electrical characteristics of the insulator are not appreciably affected and design and contour remain exactly the same. Smooth surfaces are not impaired and the insulator is kept free from possible contamination as there are no grooves to afford a lodging place for dirt, rain, snow, or ice. Electrolysis effects or abrasions cannot take place as there are no "exposed" metallic substances. The glaze protected metallic oxides "coating" on Thomas "Q-T" Insulators is as permanent as the insulator itself—its function as long-lived as the porcelain.

SPECIFY

THOMAS "Q-T" INSULATORS

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PIN TYPES
SUSPENSION
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Designs of the above are offered for all operating voltages.

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GRAYBAR ELECTRIC CO., INC., Agents

The Pioneer Since 1873

OUR 66TH YEAR

Comeaux, veteran city accountant.

Mr. Ross was connected with the power business for most of his life. Born in Chatham, Ont., he was educated in local schools and later broadened his education while teaching in the Province of Ontario. Intimates said that his interest in electricity began at the age of 11, when he flew a kite in a thunderstorm. It was also at this age that he began his lifelong hobbies of collecting minerals and experimenting with plant growths. In recent years he was considered an authority on lilies.

Advised by a physician that he should get outdoors because of a respiratory ailment, Mr. Ross prospected in northwestern Canada and Alaska when he was 25. After two years in that country, he traveled to Seattle.

Shortly after his arrival there in 1900, he opened his own electrical business. When the first unit of the city's lighting system was authorized in 1902, he turned his interest to that and in 1903 began work for the city as an engineer on the construction of the initial plant at Cedar Falls.

One year after the lighting system was separated from the city's water department in 1910, Mr. Ross became superintendent. Except for several months during 1931, when he was discharged by a mayor who was himself recalled principally because of the controversy which arose over the discharge, he remained at the head of Seattle City Light.

It was in the interval when he was not working for Seattle that Mr. Ross gained the esteem of President Roosevelt, then governor of New York. He was at that time called to New York by the state's power authority as consulting engineer on the St. Lawrence waterway project.

This was the move which led him to control of the Bonneville project. For in 1935 Secretary of Interior Ickes summoned him to Washington as adviser on the PWA's power construction program. And a few months later, when the holding company act was passed, President Roosevelt named him to membership on the SEC. He served in that capacity until his appointment as Bonneville administrator.

Although Mr. Ross' principal achievement, in point of years at least, was construction and operation of Seattle City Light, he will also be remembered for his management of the Bonneville project and for his many theories. It was he who advocated development of d.c. transmission lines from coast to coast. And at the time of his death he was applying himself closely to the problem of intertying all federal and municipal power projects in the 11 Western states.

All other Bonneville news of last month was paled into insignificance by Mr. Ross' death.

At Ampere, substation site near Vancouver, Wash., work began on excavating foundations for the first steel tower on the Bonneville-Vancouver transmission line. At other points in Washington, 3,000 WPA workers started clearing 400 mi. of right-of-way from Bonneville to Grand Coulee and to Grays Harbor. In Portland, Acting Administrator Carey told electrical appliance dealers and utility executives that "every dollar spent for generators at the dam will be followed by $5 spent by consumers for electric refrigeration. Every kw. of Bonneville power will result in $500 in appliances and utilization sales in communities served by the project."

In Washington, D. C., the House Appropriations Committee recommended that Congress provide $13,400,000 for Bonneville construction. This was $1,000,000 less than was asked by the authority.

Who'll Succeed Ross?

WASHINGTON *(McGraw-Hill Bureau)*—Stunned by the unexpected death of J. D. Ross, New Deal officials are canvassing the field for a possible successor. The selection will not be an easy one. Qualifications of the ideal candidate would include (1) unmistakable identification with the public power movement, (2) sufficient knowledge of the utility business to insure efficiency in administration, (3) effectiveness as a salesman, (4) tact to get Bonneville power sold with a minimum of irritation to the private utilities and the booster organizations.

To complicate the problem, the appointment will be for an indefinite term and the incumbent will face the possibility of being turned out of office in 1941.

Several persons now in service are possibilities for the office: ex-Senator James P. Pope, David Lilienthal, Clark Foreman, John M. Carmody, of REA, and Frank P. Walsh, now with the New York State Power Authority. It is doubtful if any of these are active candidates, but one of them might possibly be "drafted."

In the Northwest, there are, of course, a host of willing possibilities, but it is generally thought that the Administration will avoid appointing a local man. Mr. Ross, it is pointed out, was named in spite of, not because of, his prior connection with the Northwest.

In all likelihood, an appointment will not be made before the interior appropriation bill, which carries Bonneville funds for the coming year, is passed. It is also important to note that the appointment will not require Senate confirmation.

The big question here now is whether the Administration's "appeasement" program will result in the appointment of a moderate, or whether a red-hot will be chosen and to hell with appeasement.

$1,051,600 Rate Slash Approved by Denver

One of the most drastic rate slashes of recent years went into effect in Denver March 1 when the mayor signed an ordinance approving Public Service Co. of Colorado's $1,051,600 reduction.

The new schedule means a saving of 17.3% to the company's 76,575 domestic customers; a saving of 17.2% to 11,295 commercial lighting customers; 4.4% to industrial power users, and 15% to taxpayers who finance public street lighting.

Steps in the new domestic rate are first 40 kw.-hr. at 5c per kw.-hr.; next 70 at 4c; all in excess of 110 at 2½c. Minimum charge is 75c.

Abolished by the ordinance was the 5% penalty for failure to pay bills within 10 days.

Under discussion between Public Service officials and the city is a further reduction for a small class of commercial lighting consumers. Seven hundred and six larger customers contend that their average saving of 9.1% is insufficient.

Southern Utah Power to Rebuild Lines, Plant

Reconstruction of Southern Utah Power Co.'s transmission lines and a small hydro plant at Veyo was begun early last month. According to General Manager Reid H. Gardner, $100,000 will be spent on the project.

Larger conductor will be installed on 30 mi. of transmission lines, and new poles and crossarms on 15 mi. The Veyo plant will be completely rebuilt and voltage regulators and circuit breakers installed at different points on the company's system.

RESIDENTS of St. Johns, Ariz., were last month dependent on candlelight and hand power for four days after fire destroyed the $15,000 plant of Northern Arizona Utilities Co.

How a Voltage Problem Was Solved at a Saving

A NEW ENGLAND UTILITY REPORTS ITS EXPERIENCE WITH PYRANOL CAPACITORS

The Conditions

IN 1937, the Derry Electric Company, Derry, N. H., operated by the New Hampshire Gas & Electric Company, found poor voltage conditions developing on several of its circuits because of the addition of thousands of appliances and the resultant increased wattless current.

This company purchased energy subject to penalties for power-factor below 80 per cent, and these penalties approached $250 a month on one representative load of about 750 kw.

The Answer

A number of remedies suggested themselves, but failed to offer a complete solution.

A careful survey showed, however, that voltage and power-factor could be improved simultaneously by the **correct application of capacitors on the feeders themselves.** A total of 225 kva of G-E Pyranol capacitor units, ranging in size from 10-kva to 60-kva, was installed on the two rural circuits and one power circuit involved. Installed cost of the capacitors was $2200.

The Profitable Results

1. System power-factor was raised from about 60 per cent to 85 per cent, resulting in a saving of $250 per month in the cost of power.

2. Voltage was improved to the point where complaints about voltage were avoided.

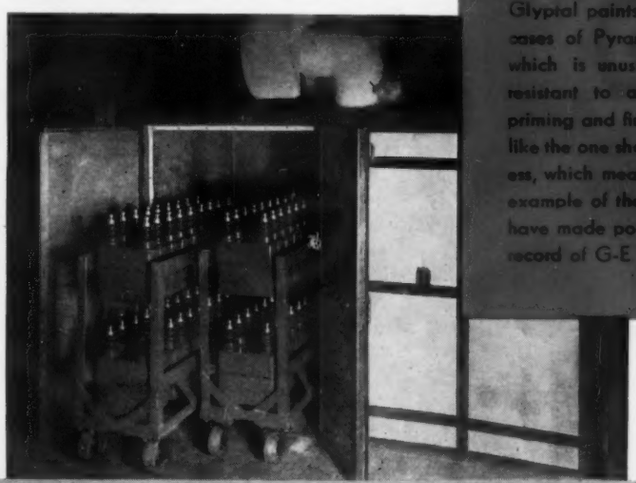
W. H. Allen, Superintendent of Distribution and Transmission, the New Hampshire Gas & Electric Co., Says

"This problem of wattless currents can no longer be restricted to industrial loads, for the magnetizing current required by the ever-increasing residential load, with its countless small motors, is fast becoming a problem.

"Our experience in applying small capacitor units carefully distributed has not only been translated into improved power-factor, but voltage regulation and voltage gradient have been bettered unbelievably. Best of all, regulation remains constant at both full-load and light-load periods."

Opportunities on Your System

It will pay you to consider applying Pyranol capacitors on your system to release capacity of overloaded substations and feeders and to improve voltage conditions. Ask your G-E representative for complete information or write for Bulletin GEA-2746, "Pyranol Capacitors for Central Station Applications." Address General Electric, Dept. 6—201, Schenectady, N. Y.



HOW RELIABILITY IS BUILT INTO G-E PYRANOL CAPACITORS

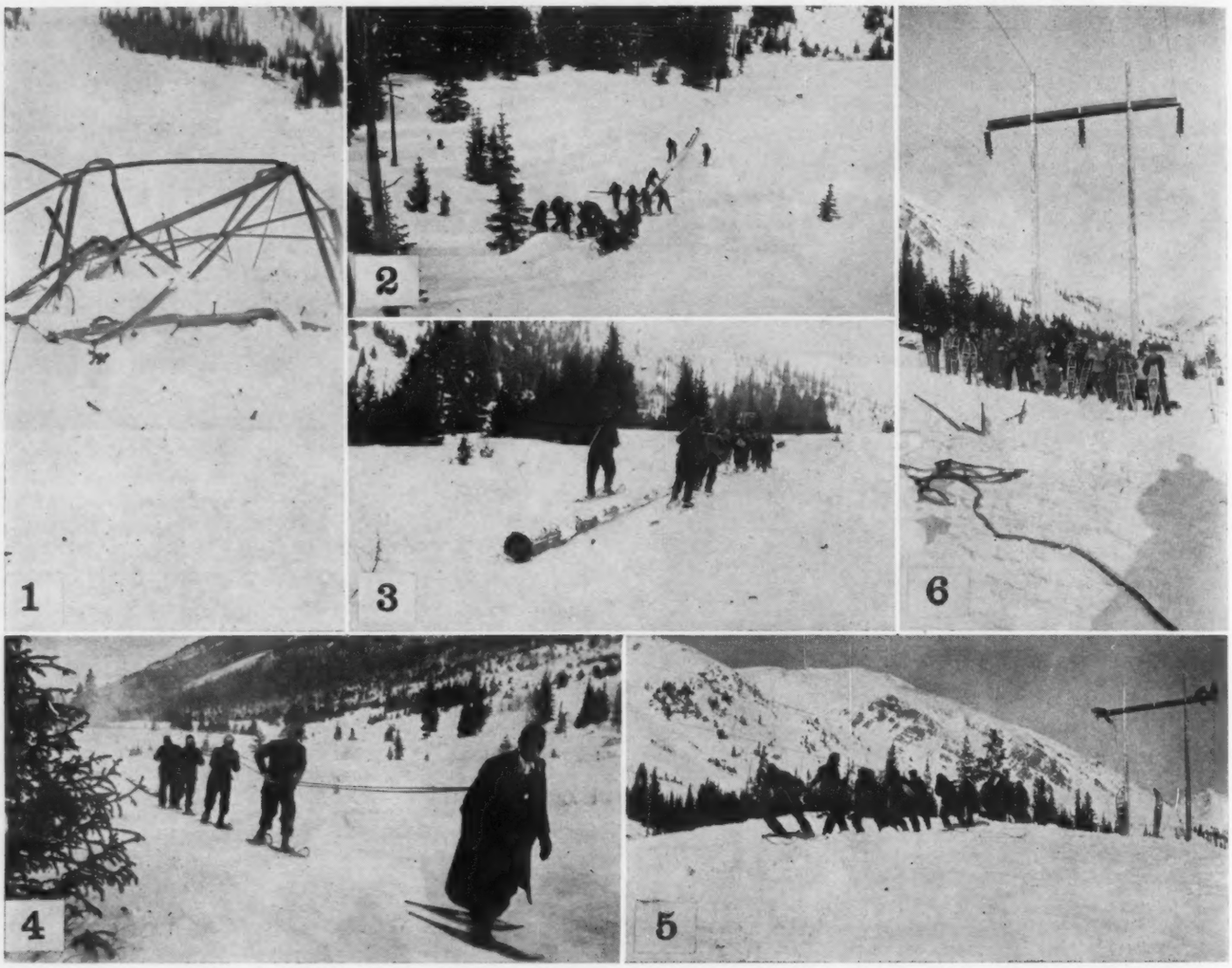
Glyptal paints applied on the tin-plated steel cases of Pyranol capacitors provide a finish which is unusually tough and exceptionally resistant to abrasion and weathering. Both priming and finishing coats are baked in ovens like the one shown at the left. This baking process, which means longer life for the finish, is an example of the manufacturing methods which have made possible the remarkable operating record of G-E Pyranol capacitors.

VISIT THE GOLDEN GATE INTERNATIONAL EXPOSITION, PAINTED WITH LIGHT BY GENERAL ELECTRIC

GENERAL ELECTRIC

360-146

Public Service Crew Fights Snow and Cold to Maintain Service



After 30 years of service, this Public Service Co. of Colorado tower (1), located in the Rockies at an 11,000-ft. elevation, went down in a snow-slide. Crews immediately snowshoed in to repair the damage. Here they are (2 and 3) skidding in a 50-ft. pole weighing 1,500 lb. The thermometer stood at —25 deg.; snow was from 10 to 30 ft. deep. "My God!" said one of the men. "That takes a man's breath at 11,000-ft. altitude." Also skidded in (4) was a 26-ft. cross-arm. According to company officials, the trick of roping the men together was "learned from the Malemutes of the frozen north." In Picture 5 the men are pulling conductor, getting ready to splice. Finally the temporary H-frame is erected (6) about 50 ft. from the original tower location and the crew pauses to breathe and relax. Another saga of construction

Who's Reserved What? That's the Big PUD Question

Mystery last month shrouded the Bonneville Administration's February announcement that public utility districts and cities of the Northwest have reserved 215,542 kw. of Bonneville power.

Cause of the confusion was the conflict between the late J. D. Ross' testimony before the House Appropriations Committee on Jan. 26 and the news release issued by the Bonneville Administration on Feb. 13.

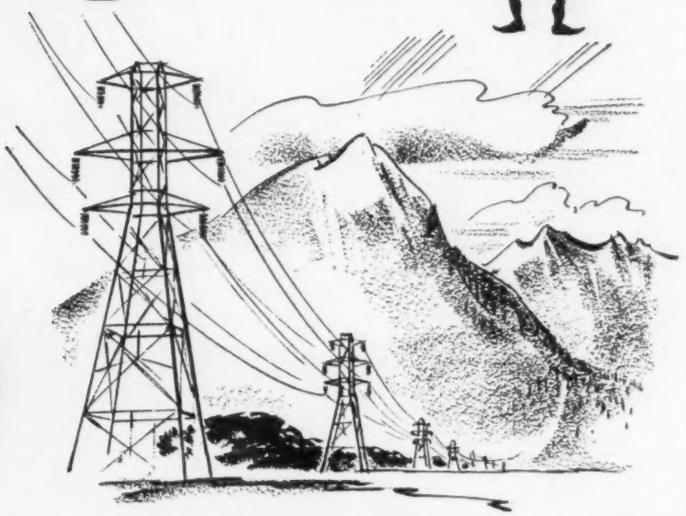
According to the House committee's report, published March 8, Mr. Ross told Congressmen that PUD's in Mason, Lewis, Pacific, Cowlitz, Wahkiakum, Skagit, Whatcom and Snohomish Counties, Wash., had asked for 150,000 kw.; PUD's in Kittitas, Chelan, Okanogan and Douglas Counties and the City of Ellensburg had asked for 57,000 kw.; PUD's in Lincoln, Franklin, Benton, Pend Oreille, Ferry and Stevens Counties and Inland Empire Rural Electrification, Inc., had asked for 17,200 kw., and the municipalities of Cascade Locks, Hood River, Eugene, Canby and Monmouth, Ore., had asked for 6.500 kw. He also said that Chipman Chemical Co. had reserved 5,000 kw. and Phosphate & Chemical Co., 56,000 kw. Total reservations were 291,700 kw.

This, Mr. Ross indicated, did not include seven additional power districts in Washington which had present requirements of 100,000 kw.

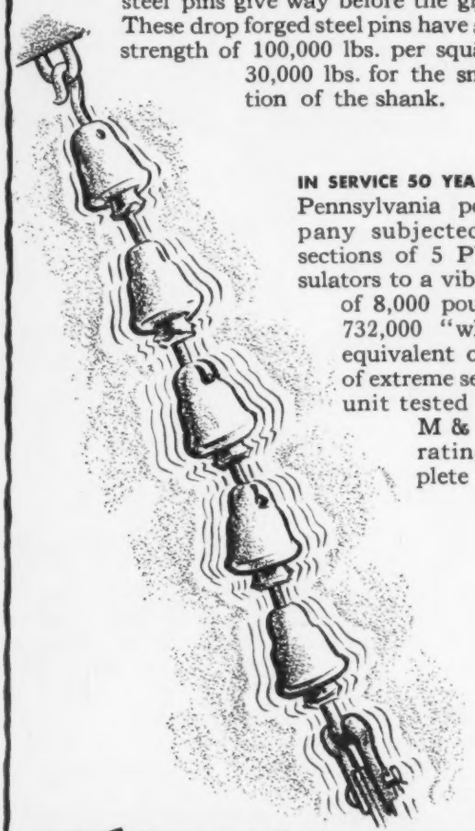
In its Feb. 13 news release, however, the Bonneville Administration announced that 22 of Washington's 25 PUD's had asked for 202,431 kw. for use by the end of 1940; Tillamook and Wickiup Peoples' Utility Districts in Oregon had asked for 3,576 kw., and seven Oregon cities had asked for 9,535 kw. These reservations totaled 215,542 kw.

"Reservations to date," said the release, "do not include a number of public power systems which have previously indicated their desire for Bonneville energy. . . . Requests for power allotments came from numerous counties which contemplate formation of public districts."

BELIEVE ME! By HARDGUY PETE



A REGULAR TEST routine for suspension type PYREX insulators is a pull to destruction at standard M & E rate of loading. No insulator fails below its rating of 18,000 lbs. and failures below 25,000 lbs. are extremely rare. Usually the steel pins give way before the glass breaks. These drop forged steel pins have an ultimate strength of 100,000 lbs. per square inch or 30,000 lbs. for the smallest section of the shank.



IN SERVICE 50 YEARS! A large Pennsylvania power company subjected the hub sections of 5 PYREX insulators to a vibrating load of 8,000 pounds. After 732,000 "whips", the equivalent of 50 years of extreme service, each unit tested above the M & E strength rating for complete insulator.

FROM 40° F. BELOW to 210° F. above, and back again! To test PYREX insulators under sudden and extreme temperature changes, 10 insulators were each cooled in a bath of carbon dioxide snow and alcohol at —40° F. and then suddenly submerged in a bath of boiling water at 210° F. The cycle was then reversed and this was repeated 60 times. There were no breakages and the same insulators were then tested to flashover without failure!

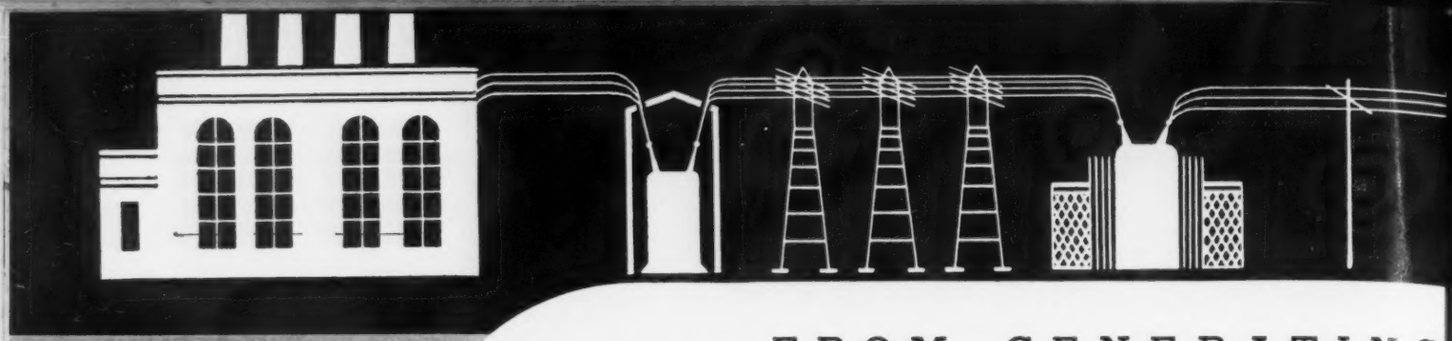
PYREX BRAND ELECTRICAL glass is no more like ordinary glass than cheap crockery is like good electrical porcelain. It is made to a special formula. Tough, hard, non-porous, the dielectric strength of PYREX brand electrical glass is at least 3200 kv. per inch.

INVITATION TO POWER MEN!

It's open house at Corning anytime you're nearby! Drop in and see how we make glass—and why PYREX brand glass makes better insulators!

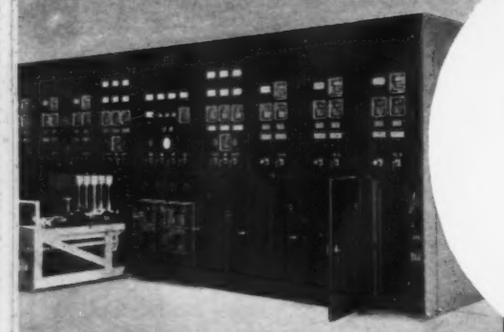
PYREX INSULATORS

"PYREX" *is a registered trade-mark and indicates manufacture by*
CORNING GLASS WORKS, CORNING, N.Y.

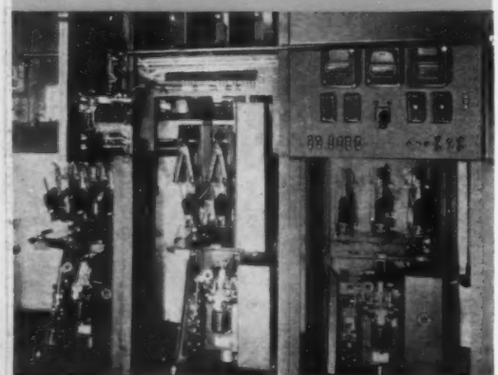


FROM GENERATING

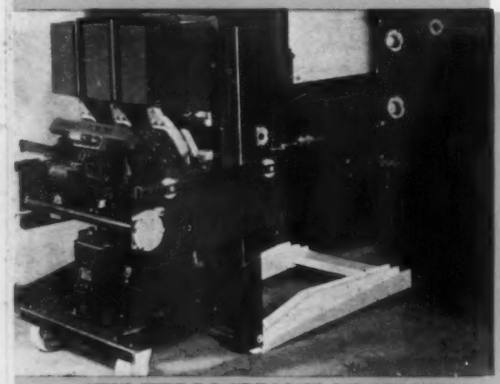
RELATED



METAL-CLAD SWITCHGEAR . . . Factory assembled — assures lower installed cost, complete safety, minimum maintenance, and unexcelled operating reliability.



TYPE U "DE-ION" AIR BREAKERS . . . Up to 15 Kv. Oilless, high-speed arc control, simplified inspection and maintenance; universal mounting.



NEW TYPE DA "DE-ION" AIR BREAKERS . . . Give circuits of 600 volts and below a better break by reducing arcing time and burning of contacts. Fixed or removable mounting.

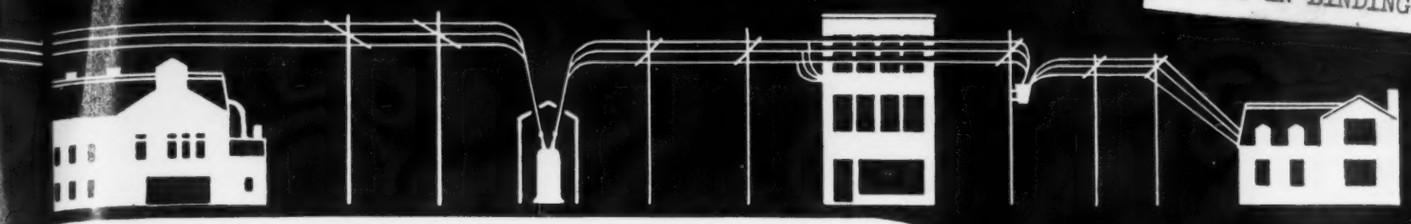
Westinghouse "miniature system" tests take guesswork out of system planning

In originating the A. C. Network Calculator, Westinghouse has enabled scores of utilities to know in advance the actual effect of projected changes in their systems. During the past 9 years, over 200 systems or portions of systems have been set up in miniature on the Network Calculator for study. Probably the most important single contribution to the central station industry, this development makes possible accurately coordinated and related system protection. Full information on how the A. C. Network Calculator may be made available for study of your problems will gladly be forwarded on request.

WESTINGHOUSE ELECTRIC

Westinghouse

PRINT IN BINDING

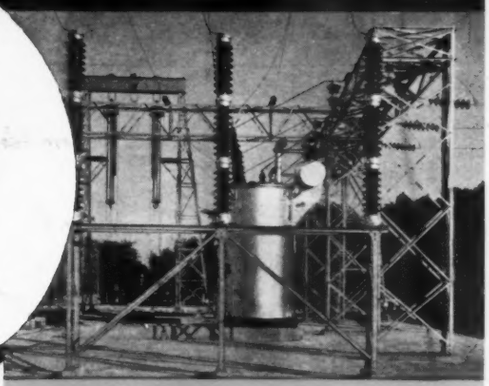


STATION TO LAMP SOCKET...

PROTECTION

FOR THE WHOLE JOB...

...better protection for any part!



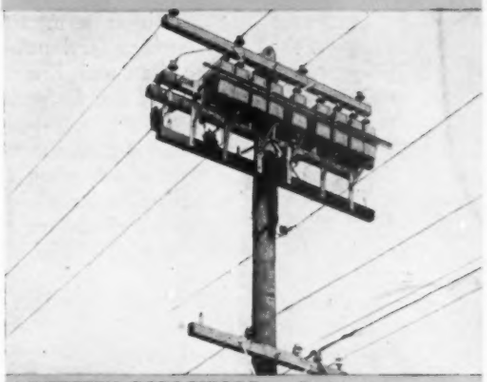
TYPE SV STATION ARRESTERS... Low protective ratio and high surge capacity. Assure maximum protection to connected equipment and protective device.

Correct protection . . . for generator, for substation, for any system part . . . is not a piecemeal problem. System stability goes up . . . costs per kw-hr. go down . . . when protective equipment is correctly related, in design and action, both to other protective apparatus on the line and to over-all system operation.

With the broadest background of over-all system engineering experience in the industry, Westinghouse is able to supply the *correct* protective equipment for an entire system, or any part of it, with completely co-ordinated and predetermined results.

Whether you have a problem of improving system stability, increasing capacity, or replacement of present equipment, you will find it profitable to investigate newest developments in Westinghouse *related protection.* Make sure — *be sure* — check Westinghouse before you buy! Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7N.

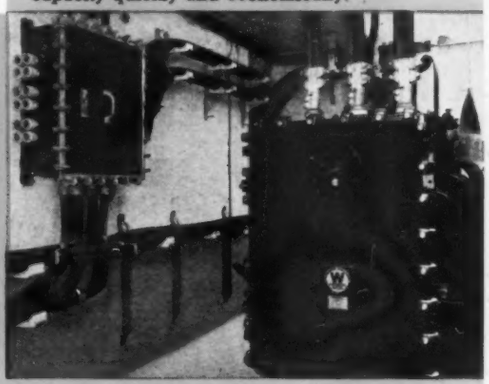
J-60290



INERTEEN CAPACITORS... Protect your income by mounting capacitors on poles near load centers. Improve both power factor and line voltage . . . add "pay load" capacity quickly and economically.

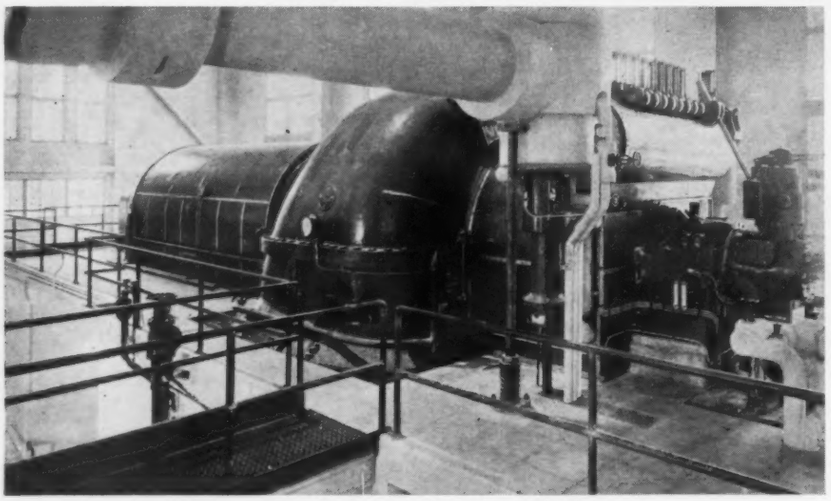
NTROL DESKS... Centralized con- and space saving, sectionalized desks, gral hinged rear instrument and relay els; circular desks available for even e convenience and compactness.

NEW STAINLESS STEEL RESISTORS... For neutral grounding. Absolutely weatherproof. Will not deteriorate. Non-inductive — withstand longtime duty cycles. Light, strong, unaffected by temperature changes.



NETWORK PROTECTORS... Standard Westinghouse designs have kept pace with latest developments in modern network system practices.

e Protective Equipment



40,000-kw. turbo generator, Unit No. 4, at P.G.&E.'s Station C

P. G. & E. Dedicates Oakland Steam Plant

Dedicated last month at a meeting of more than 160 business and public officials was Pacific Gas and Electric Co.'s modernized and enlarged Station C, Oakland steam plant.

Built at a cost of $6,200,000, the station is the first major power plant installation on the utility's system since 1930. Three more steam plants, representing an investment of $15,000,000, are under construction at Martinez, Avon and Oleum.

Rebuilding of Station C now makes that plant the second largest in the system. Originally constructed in 1908, the plant was frequently enlarged until, before this recent program was undertaken, its capacity reached 88,975 hp. The present program brings this figure up to 155,999 hp.

Reconstruction work consisted of making the old 250x220 ft. building 90 ft. longer and 55 ft. wider. Two new turbine generators, one of 67,000 hp. and the other of 5,900 hp., were installed. Five boilers were replaced by two 450-lb. pressure boilers. The water system which takes salt water from the Oakland estuary for cooling purposes was revamped and its capacity enlarged. Added to the water-circulating lines were 700 ft. of 72-in. pipe.

Across First St. from the station the company erected a new switch house, 175x65 ft. From this point a 110,000-volt cable was laid to the substation at Park Blvd. and Excelsior Ave., tying the enlarged plant into the interconnected system.

Three 11,000-volt cables from the switch house to the substation on the Key System Mole supply the Golden Gate Exposition and the transbay-bridge train service.

Speakers at the dinner, at which Lee H. Newbert, manager of the company's East Bay Division, presided, included Raymond M. Alvord, General Electric vice-president, who told how his company installed one of the earliest of steam-turbine generators at the power house in 1908; P. M. Downing, vice-president and general manager of P.G.&E., who said that growth of the East Bay had necessitated the enlargement of the station, and James B. Black, P.G.&E. president, who told how he first went to work for the company at Station C.

According to Downing, two of the three other 67,000-hp. steam plants will be completed this year, the third in 1940.

WASHINGTON *(McGraw-Hill Bureau)*—A drastic turn in business is expected by Washington economists almost any time now. Factors that would make for an upturn seem to outnumber those making for a downturn. The feeling in government quarters continues to be that spending is providing more stimulation to business than the promise that taxes will not go up. The carrying forward of the construction program on the Tennessee River means more in the way of employment, it is held, than anything the utilities might do if further appropriations were withheld. If congress wants to delimit the area in which the government operates the power business, it is pointed out, it can require that the power be sold at the busbar.

TWO 3,333-KW. transformers have been installed in the substation at Grand Coulee Dam to supply power for the damsite and all surrounding communities. Four transformers are already in place.

Portland Electric Power Faces Reorganization

Accumulation of unpaid interest as of March 1 on Portland Electric Power Co. collateral trust income bonds presages financial reorganization of the company through the federal Securities & Exchange Commission, operating under the Utility Holding Company Act.

This was the gist of a report by Franklin T. Griffith, president, at a meeting of stockholders March 8. Griffith informed the stockholders that the necessary legal steps to effect reorganization would be taken during the month.

Portland Electric Power's collateral trust income bonds in the amount of $16,500,000 have accumulated nearly $5,000,000 of unpaid interest or over 30% of the face value of the issue. Under the provisions of the indenture, the trustee has the power to declare the entire issue due and payable, Griffith's report stated. He added that in the opinion of the directors, Portland Electric Power, which owns Portland General Electric Co. and Portland Traction Co., has assets substantially in excess of the total amount due on the income bonds. Both the bondholders and stockholders will be protected in any adjustment that is made, and since both Portland Electric Power and Portland G. E. are registered holding companies, therefore subject to the jurisdiction of the SEC, whatever plan is evolved must be approved by that commission after a hearing of all interested parties.

Business conditions brought about a reduction in net earnings of Portland G. E. for the year 1938, though the trend of output and earnings is now up. Portland Traction failed in 1938 to earn its operating expenses, taxes and depreciation, but the deficit was less than for 1937. The interurban railway system, owned directly by Portland Electric Power, failed to earn operating expenses.

Despite these facts, and largely because general conditions in the territory appear to be improving, Griffith's report expressed optimism that the financial troubles of the company could be resolved.

TREBLING the capacity of the Buhl substation is the object of work started by Idaho Power Co. Total expense is $45,000. Capacity of the station will be increased from 1,000 to 3,000 kw. The new equipment will provide a means of serving three 11,000-volt rural lines between Castleford and the Snake River canyon. It will also permit interconnection of the Buhl and Twin Falls substations through the 11,000-volt lines.

ROLLER-SMITH ANNOUNCES

New Catalog P-8-a on

METAL CLAD SWITCHGEAR

This Catalog, a copy of which will be sent you on request, should be in the hands of every man interested in metal clad oil circuit breaker switchgear. It is well illustrated and full of technical data and suggestions.

You can't afford to buy metal clad switchgear without consulting Catalog P-8-a.

Roller-Smith makes not only the switchgear but practically all of its components: oil breakers, instruments, primary disconnects, instrument and control switches, transformers, control relays, steel work, etc., etc.

Metal clad switchgear is the *modern* switchgear. Roller-Smith makes all types for all purposes—all up to the minute in design.

ROLLER-SMITH COMPANY

Electrical Measuring and Protective Apparatus

MAIN OFFICE AND WORKS **BETHLEHEM, PA., U. S. A.**

Sales Agencies in Principal Cities in United States and Canada.

Every house needs
Westinghouse
SELLING UP IS EASY!
Yes, the Dictator has every essential standard feature and 9 PLUS features not offered on the lower price Diplomat.

THE PACEMAKER LINE FOR '39

with the RIGHT features on the RIGHT ranges

SELLING UP requires more than an offer of PLUS features. Every model must have the same basic speed, results, and economy features to assure the tops in cooking performance, no matter what model is bought. The 8 beautiful new *Kitchen-proved* Westinghouse Ranges follow through — Solid-Top Corox Units, SuperOven, Single Dial Oven Control, and One-Piece Body are standard on ALL models.

Then, each range also has its own practical *plus* features which prospects quickly appreciate. Stationary Platform Light, Surface Unit Signalite, Minute Minder, Time-Controlled Cooker, Menu Master Broiler Pan — these are typical of the many *Kitchen-proved plus features* women want and you can offer in selling up.

Step up your profits — *sell up* with the star feature Pacemaker Line in '39. See your Westinghouse Distributor or write Dept. 9063, Westinghouse Electric & Mfg. Co., Mansfield, O. for complete facts and advertising and promotional helps.

"GUESS AGAIN"
Streamlined
Discovery Demonstration
A proved plan for ringing up
Greater Sales
...ties right in with the new MKB program
Last fall, out of 184 Discovery Demonstrations checked in a few districts, retailers obtained the amazing total of 3,266 prospects, sold 145 ranges, 22 refrigerators, 54 other appliances during the demonstrations! Now the nationwide 1939 Streamlined Discovery Demonstration will get even more prospects, make more sales. See the new plan book. Read how you can demonstrate and pocket profits.
GET THE DETAILS
of this big profit plan NOW
Westinghouse

Westinghouse *Kitchen-proved* Ranges

"The Line of Least Resistance"

Colorado Brings Commission Men Under Job Insurance

As a result of a state supreme court decision, Colorado became in February the first state to bring commission salesmen under job insurance.

Although the case at issue involved an insurance salesman, the principle established affects all commission salesmen, including those working for electric utilities. Under the Unemployment Compensation Act, the court ruled, commissions have the same status as wages, and agents as employees.

Justice Otto Bock, who wrote the opinion, made it clear that the court found that part-time as well as full-time workers are entitled to the benefits of unemployment compensation, and employers must make contributions as provided by law.

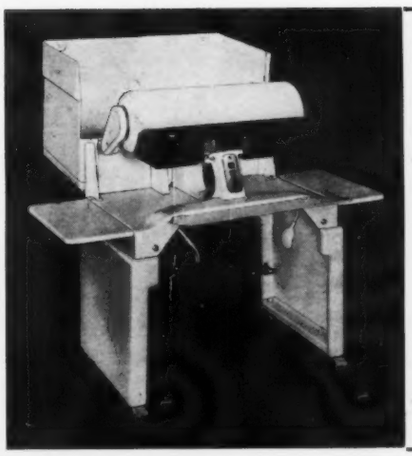
Approximately 5,000 commission salesmen in Colorado are affected by the ruling.

IDAHO POWER CO. has reduced rates by $76,000 annually in Ontario, Nyassa, Malheur, Vale and Halfway, Ore., and a large rural area in the Snake River valley in Oregon and Idaho. Residential lighting reductions aggregate $25,000 annually; commercial lighting, $15,000 annually; commercial water heating, $7,000 annually, and combined light and power, $20,000 annually.

REVISED TARIFF reducing the minimum charge for seasonal use of power for agricultural purposes from $12 to $9 per hp. installed per season was filed last month with the Oregon Public Utilities Commissioner by Portland General Electric Co. Absolute minimum charge per season would also be reduced from $40 to $25.

WESTERN COLORADO POWER CO. last month announced a $20,000 rate reduction effective in Montrose, Ouray, Durango, Telluride, Ridgeway and other communities in Colorado. Residential and commercial customers will save 14 to 20% a year.

PLANS FOR an enlarged power plant on the Moyie River have been drawn up by the Bonners Ferry, Ida., municipal power system. The plant has been made necessary by an extensive cut in residential and commercial rates. Under the new schedule, residential customers will pay 6½c per kw.-hr. for the first 40 kw.-hr. as compared with the old rate of 9c for the first 30. Commercial rates, first step of which used to be the same as for residential customers, has been reduced to 6½c per kw.-hr. for the first 100 kw.-hr. Other steps have been lowered in proportion.



Ironrite
ELECTRIC IRONERS

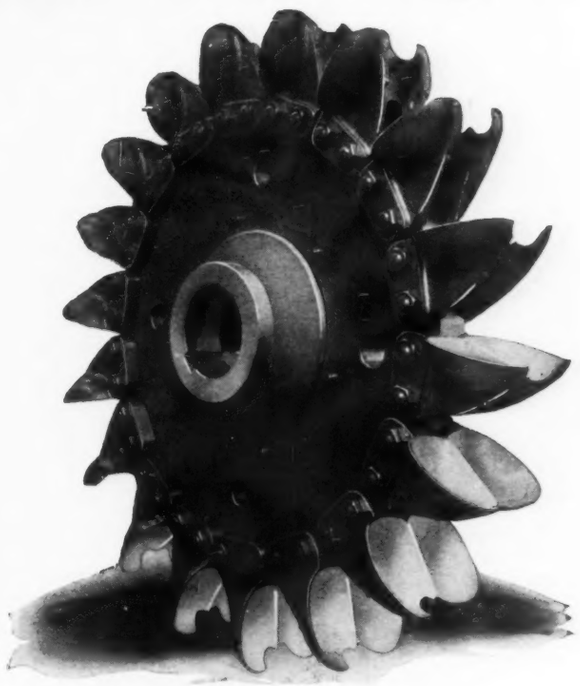
Announcing the New IRONRITE Line for 1939—Now ready

NEW MODELS
NEW BEAUTY
NEW FEATURES
NEW SELLING POWER

Make Bigger Dealer Profits in 1939 with IRONRITE

GORDON E. WILKINS
Pacific Coast Manager
3100 Telegraph Ave., Oakland, Calif.

Realize Maximum Output from the Existing Water Supply



TAKEN on the average the cost of new hydraulic equipment may be from 3 to 5 per cent of total development costs, and yet the performance of these mechanical units determines, to a marked degree, the ultimate success of the project.

Regardless of contemplated developments, logic suggests a careful analysis of the older plants... to determine the possibilities for increased capacity from existing water supply. Many of the older plants have been modernized at comparatively small cost, resulting in increased output with greater reliability and safety. Ask Pelton engineers for specific proof.

THE PELTON WATER WHEEL COMPANY
HYDRAULIC ENGINEERS
120 Broadway 2929 Nineteenth St. Paschall Station
NEW YORK SAN FRANCISCO PHILADELPHIA

PELTON

New Mexico Passes New Laws Affecting Utility Operations

Fourteenth New Mexico state legislature adjourned last month after a busy session during which numerous bills directly affecting utilities' operations were introduced.

Of primary interest were two regulatory measures, introduced in both houses, covering distribution of electricity, gas and water by both privately and municipally owned plants. Both bills were defeated, as was a bill to repeal the Session Laws of 1921 preventing firms from competing with established utilities in the smaller communities unless a certificate showing necessity of convenience could be obtained.

Enacted was a law to conform with federal REA regulations pertaining to communities of less than 2,500 population. This will permit REA projects to serve areas already served by established utilities.

Passed was a new excise tax imposing a 2% levy on storage, use and consumption of tangible property purchased outside the state. The levy, which is supplementary to the existing state sales tax, becomes effective July 1, 1939.

Shortly before adjournment a bill providing for annual inspection of all electric, gas and water meters at a charge of 50c per meter was defeated.

WILLAPA ELECTRIC CO. last month contracted to sell its entire county distribution facilities to Pacific County (Wash.) Public Utility District for $189,000. At the same time, Bonneville's acting adimnistrator, Charles E. Carey, executed a contract to purchase the company's high-voltage transmission line from Aberdeen to Raymond, Wash., for $156,000. The steel-tower circuit, already insulated for 66,000 volts, ultimately will be raised to 110,000 volts and become a part of the Bonneville network.

UTAH POWER & LIGHT CO. has signed an agreement designating Local B-57, International Brotherhood of Electrical Workers (AFofL), as sole bargaining agency for employees on matters of wages and working conditions. The local is a vertical one, with membership restricted to employees of the company. Approximately 1,200 of the 1,400 employees are eligible for membership. The agreement specifically prohibits strikes or lockouts and provides for arbitration of all disputes. It does not provide for a closed shop, but states that all employees must bear an equal and proportional share of all collective bargaining.

These three men represent more than 150 years of continuous service with Washington Water Power Co. They are G. A. Hulquist, John B. Fisken and Louis Englebart. Here they cut the company's golden jubilee birthday cake

NWEL&PA Prepares for 16th Annual Meeting in Seattle

Sixteenth annual meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn., will be held at the Olympic Hotel, Seattle, April 19-22.

A. Vilstrup, section chairman and chief engineer of B. C. Electric Railway Co., has allotted a half-day session to each of the six committees that will present timely papers and discussions on subjects pertinent to their committee functions. April 22 will be devoted to trips now being arranged by J. Hellenthal, Puget Sound Power & Light Co., chairman of the local arrangements committee.

Committee chairmen who will conduct their respective programs are: E. H. Collins, Washington Water Power Co. —power production committee; R. J. Davidson, Pacific Power & Light Co.— transmission and distribution; Walter Brenton, Portland General Electric Co. —utilization; M. T. Crawford, Puget Sound Power & Light Co.—codes; R. S. Maxwell, Puget Sound Power & Light —accident prevention, and Hellenthal— electrical equipment.

EXTENSION of Pasadena (Calif.) Municipal Light & Power Dept.'s underground system to include more than a score of streets within the next two years was given preliminary consideration by the board of city directors Feb. 28. The work was recommended by City Manager C. W. Koiner, who declared it would be economical to the department over a period of years because it would eliminate danger of service interruptions from weather causes. Koiner said the cost of overhead lines blown down and broken by falling trees during the February windstorm will approximate $50,000.

Washington Water Power Celebrates 50th Anniversary

More than 300 Washington Water Power Co. employees were honored last month at the Golden Jubilee banquet in Spokane celebrating the founding of the company. The group represented those having more than 20-years' continuous service with the company.

The celebration brought three veterans of more than 50-years' service into the spotlight. Each worked for Spokane Electric Light & Power Co., which was incorporated under the name of the Washington Water Power Co. on March 15, 1889. They were John B. Fisken, one of the two employees of the original company; Louis B. Englebart, who was a lamp trimmer by day and station-operator in the late afternoon and evening for the Spokane Falls Co., and G. A. Hulquist, dynamo tender who entered the service exactly 50 years ago.

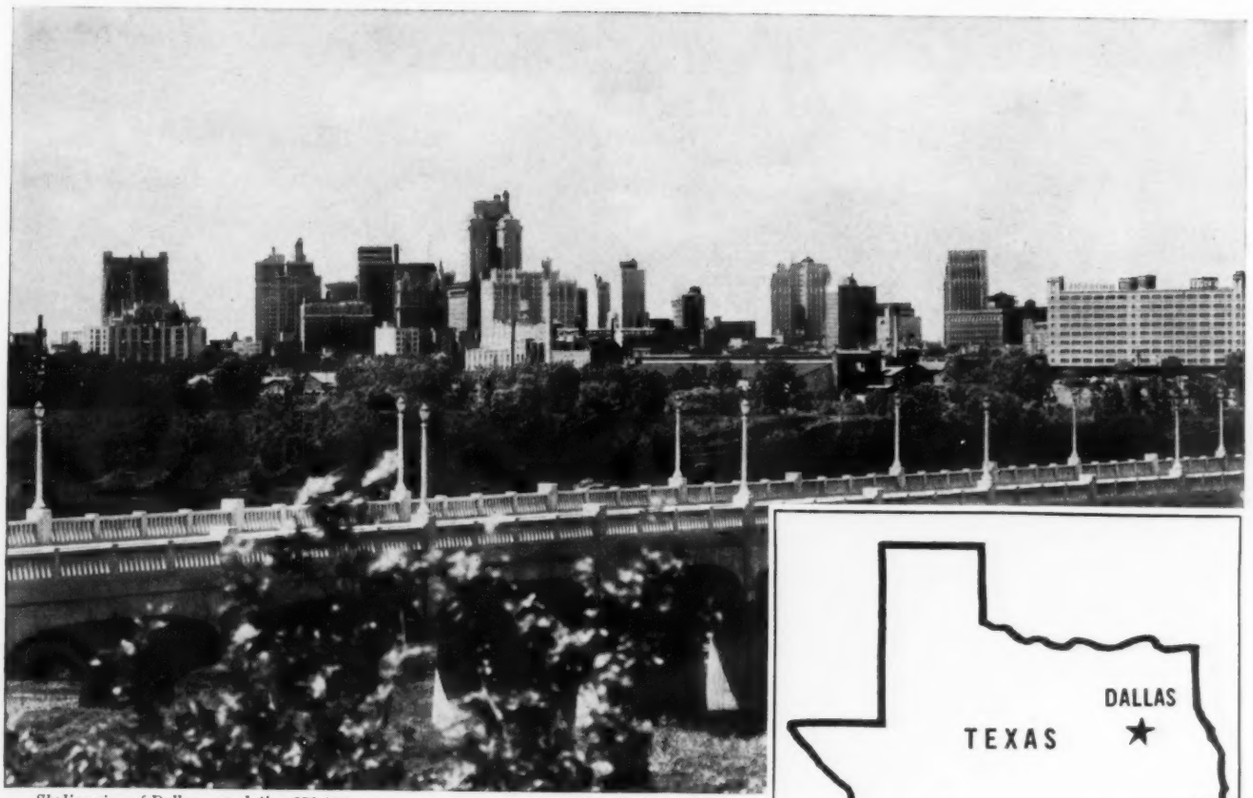
J. E. E. Royer, vice-president and general manager of Washington Water Power, was toastmaster for the banquet program, which included presentation of service buttons to those who had served the company for many years. One diamond was added to the pins for 30-years' service; two for 40-years', and three embellished the pins presented Fisken, Englebart and Hulquist.

Principal speaker of the evening was Eric Johnston, president of Brown-Johnston Electrical Supply Co., Spokane, and director of the U. S. Chamber of Commerce. Kinsey M. Robinson, power company president, and Frank T. Post, chairman of the board, also spoke briefly.

Utah Seeks Investigation of Proposed Power Project

Utah's state legislature has been asked for an appropriation of $100,000 to finance an engineering investigation of the Colorado River-Great Basin combined irrigation and power project recently proposed by the Utah Engineering Committee for study of the utilization of Colorado River waters.

The proposed development would consist of a storage reservoir at the Flaming Gorge site on the Green River near the Utah-Wyoming state line, with power plants on the Green, Yampa and Colorado Rivers where energy would be generated to pump 1,500,000 acre-ft. of water annually over the Uintah and Wasatch Mountains. Additional power plants would be located at Thistle, Nephi and Fairview on the western end of the 203-mi. aqueduct. Power from these plants would replace and supplement energy now generated on the Bear River and release some 300,000 acre-ft.



Skyline view of Dallas, population 273,000 *(Photo-Ewing Galloway)*

Selling lamps and lighting in DALLAS, TEXAS

(and cities of similar size)

HERE'S a quick picture of the way that G-E lamp advertising is constantly at work in Dallas, promoting light-conditioning for Better Light-Better Sight. Into Dallas homes every week goes a steady stream of G-E lamp and lighting advertisements amounting to 50 impressions per person in the last ten years.

IN 1939... 960,000 magazines with General Electric lamp advertisements and 310,000 radio messages.

SINCE 1929... 10,128,000 magazines with G-E lamp advertisements.

FALL 1938... 882,000 copies Dallas newspapers with G-E lamp advertisements. **LAST 3 YEARS...** 2,343,000 newspapers with G-E lamp advertisements.

SINCE 1929... 13,711,000 advertisements in magazines, newspapers, and radio. Which is . . . approximately 50 advertising impressions per capita.

IN YOUR CITY. You can easily estimate the approximate number of lamp and lighting advertisements General Electric is delivering to your customers by applying the following national averages:

Going into the average wired home in 1939

14 magazines with G-E lamp ads
5 newspapers with G-E lamp ads
5 radio messages

24 total advertising messages

• • •

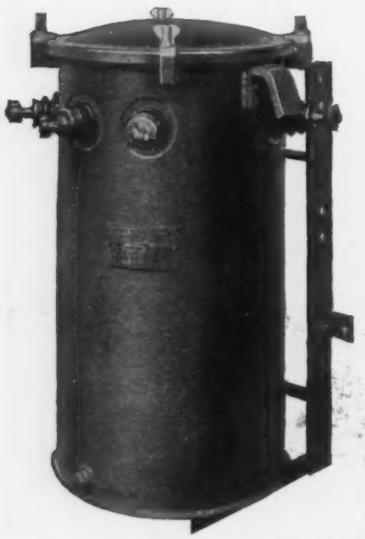
In the last 10 years, the average wired home received

158 magazines with G-E lamp ads
30 newspapers with G-E lamp ads
20 radio messages

208 total advertising messages

EDISON MAZDA LAMPS

GENERAL ELECTRIC



Wagner 15 kva., 2400 to 120/240 volt, 60 cycle, single-phase, type HEB stud-bushing-type transformer. It has coordinated bushings and insulation and is self-protecting against lightning, and, therefore, inherently a surge protected transformer.

Wagner
DISTRIBUTION TRANSFORMERS

STUD BUSHING TYPE—With bushings through tank wall.

STUD BUSHING TYPE—High voltage bushings through cover, low voltage bushing through tank wall.

POCKET LEAD TYPE—

RURAL LINE—High voltage bushing through cover, low voltage bushing through tank wall.

SURGE-PROTECTED — Stud-type equipped with arrester or gaps.

Wagner distribution transformers are modern in design and construction, and conform to the latest standards. They embody such features as: (1) carefully selected, pre-tested materials, (2) low electrical losses, (3) good regulation, (4) adequate safety features, and (5) details that make them easy to install and maintain. They are completely described and illustrated in Bulletin No. 180, a copy of which will be sent you upon request. Write today for your copy.

T39-3

Specify Wagner Transformers in Your Request

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.
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• For your convenience, stocks of "Nichrome" as well as other Driver-Harris special alloys are maintained at strategic points on the West Coast.

You may specify "Nichrome" (the dependable heat resisting alloy) and receive prompt action from

Electrical Specialty Co., Inc.
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Seattle, Washington

Electrical Specialty Co. of Southern California
451 South San Pedro Street
Los Angeles, Calif.

DRIVER-HARRIS COMPANY
Harrison, N. J.

NICHROME

Future Conventions

Lure of the Golden Gate Exposition will bring many national and regional conventions of interest to electrical men to northern California this summer. They are:

NATIONAL ELECTRICAL CONTRACTORS' ASSN.—Joint meeting of northern and southern California chapters in Fresno, April 22.

PACIFIC COAST ELECTRICAL ASSN.—In Del Monte, May 18-20. The RMEL and NWEL&PA have been invited to join in the meeting.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—National convention in San Francisco, June 25-30.

INSTITUTE OF RADIO ENGINEERS—National convention in San Francisco, June 28-30.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—National convention in San Francisco, June 26-July 3.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National convention in San Francisco, July 23-30.

INTERNATIONAL ASSN. OF ELECTRICAL INSPECTORS—Joint meeting of Northwestern and Southwestern Sections in San Francisco Aug. 7-10.

ILLUMINATING ENGINEERING SOCIETY—National convention in San Francisco, Aug. 21-25.

of water for irrigation purposes.

The project contemplates the initial irrigation of 600,000 acres of fertile land.

FAR BELOW NORMAL is the California mountain snow-pack, the California Cooperative Snow Surveys reported March 9. The shortage is greatest towards the north, the Feather, Pit and Upper Sacramento watersheds reporting but 40%, 36% and 24% respectively of the normal seasonal total.

DEVELOPMENT of a $450,000 municipal hydroelectric plant has been proposed by the City of Victoria, B. C. If the city council's application for a loan from the provincial government is approved, the plant will go into competition with B. C. Electric Railway Co., already supplying power and light to Victoria.

REA Activities

WASHINGTON *(McGraw-Hill Bureau)*—Beginning March 6, some 8,000 farm customers of ten rural electrification cooperatives in Iowa were subjected to an intensive sales campaign, objective of which was to make "five years' progress in 60 days" in appliance saturation. Hope of the Rural Electrification Administration is that a technique can be worked out in Iowa to bolster revenues on its many projects throughout the country.

Inasmuch as complete use of power requires many fixtures and appliances, and returns from the more than 350 REA projects so far energized are disappointing, success of the experiment is a question mark. Recent testimony of Administrator John M. Carmody shows that during the first six months

THE STRONG STEEL CORE in each Copperweld wire is permanently protected by a heavy welded-on layer of pure copper — of guaranteed thickness.

Be sure to get your copy of E.D. 1678—Copperweld Overhead Ground Wires for Transmission Lines. Just write to—

Pacific Coast Representative: C. E. Ingalls, Rialto Building, San Francisco, California

COPPERWELD STEEL COMPANY · GLASSPORT, PA.

COPPERWELD

Non-Rusting OVERHEAD GROUND WIRES

of service these projects have realized only 48% of their anticipated revenue, and that even after 18 months the average has climbed to only 92%. How to accelerate this curve is the present problem of REA.

What holds up consumption is the necessity for wiring farm buildings, buying fixtures and appliances. Being a canny soul, the farmer has a tendency to hold these expenses to a minimum, even though he may intend to add to his equipment in the future.

So the problem becomes one of reducing costs. Using the fact that each project opens up a large market as bait, REA has approached manufacturers, distributors and dealers with the proposal that profit margins be reduced and sales efforts intensified in an effort to speed up the purchase of equipment. The plan is getting its initial tryout in the Iowa experiment, where installed costs have been slashed from 25 to 35%.

Household equipment is getting the bulk of the sales effort, with the primary pressure on ranges, followed by refrigerators, mixers, lighting fixtures, etc.

BENTON RURAL ELECTRIC ASSN., Prosser, Wash., has been allotted $25,000 to build 17 mi. of line in Benton and Yakima Counties.

CENTRAL VALLEY ELECTRIC MEMBERSHIP CORP., Artesia, N.M., has been allotted $25,000 to finance house wiring and plumbing installations.

ROOSEVELT COUNTY ELECTRIC MEMBERSHIP, Portales, N.M., has awarded a contract to Uvalde Construction Co., Dallas, to build 111 mi. of line, $91,486.

JEFFERSON VALLEY RURAL ELECTRIC COOPERATIVE, Whitehall, Mont., has been allotted $94,000 to build 80 mi. of line.

RIVERTON VALLEY ELECTRIC ASSN., Riverton, Wyo., has been allotted $52,000 to build 47 mi. of line in Fremont County.

MOON LAKE ELECTRIC ASSN., Mt. Emmons, Utah, has been allotted $10,000 to finance house-wiring and plumbing installations.

Contracts Awarded

TO ALUMINUM CO. OF AMERICA for copper conductor and appurtenances for Bonneville's Vancouver-Eugene line, $123,535.

TO CORY & JOSLIN, San Francisco, for electrical work on laundry at Imola, Calif., $5,780.

TO STURGEON ELECTRIC CO., Denver, for electrical work on addition to Colorado Museum of Natural History, $7,928.

TO H. A. MCMURPHY, Los Angeles, for air conditioning, ventilating system and construction of processing plant for Eastman Kodak Co., Los Angeles, $150,000.

TO ALLIS-CHALMERS MFG. CO., Los Angeles, for 60-cycle, outdoor-type, oil-immersed, forced air-cooled transformers for Los Angeles Dept. of Water & Power, $432,253.

TO STURGEON ELECTRIC CO., Denver, for electrical work on hospital addition for Colorado School of Medicine and hospital in Denver, $8,745.

TO CONSOLIDATED STEEL CORP., Los Angeles, for two turbine inlet pipes for Units A-6 and A-7 at Boulder power plant, $18,155.

TO G. W. FIRTH ELECTRIC, Vancouver, B.C., for wiring and lighting of barracks and other buildings at the new air-force station at Elford Bay, B.C.

TO N. A. RUSSELL, Santa Rosa, Calif., for electrical work on ice and cold storage plant at Eldridge, Calif., $1,438. To Ice Machine Co., Los Angeles, for refrigeration and mechanical work, $31,572.

TO FRITZ ZIEBARTH, Long Beach, Calif., for erecting steel towers for two 230-kv. lines from North Bonneville to Vancouver, Wash., and stringing conductor, $349,492.

TO GREAT WEST ELECTRIC & RADIO, Vancouver, B.C., for lighting and wiring installations in additions to store of Famous Cloak & Suit Co., Vancouver.

TO GENERAL ELECTRIC CO., Schenectady, for two oil circuit breakers and two lightning arrestors for installation in the City of Los Angeles switchyard, Boulder power plant, $252,650. To Bowie Switch Co., San Francisco, for five disconnecting switches, $61,300.

TO GENERAL ELECTRIC CO., Schenectady, for three 25,000-kva. transformers for installation in the Bonneville substation near Vancouver, Wash., $384,099.

TO ALLIS-CHALMERS MFG. CO. for six 15-kva., 100,000-volt breakers and six 15-kva., 500,000-volt breakers for the Tacoma Municipal Lighting Dept., $23,719. To Love Electric Co., Tacoma, for supplying annual requirements of meters and instrument transformers; $40,000 was appropriated. To Graybar Electric Co. for incandescent lamps; $10,000 was appropriated.

TO ALLIS-CHALMERS MFG. CO., San Francisco, for four 103,000-hp. turbines and four governors for Shasta Dam, $1,866,400.

TO RADELFINGER BROS., San Francisco, for electrical work on science building and cafeteria for San Francisco Junior College, $124,315.

TO LARSON CONSTRUCTION CO., Denver, for constructing transmission line for the Kendrick project from Seminoe Dam to Cheyenne, Wyo., $59,678.

Two Bits a Wash

Renting your washer out to college students for 25c a washing is a bad practice. A woman who had this idea recently called Utah Power & Light to explain her troubles. It seemed that the students were saving their washings for three weeks at a time, then doing it all together. The out-smarted housewife was frantic. "Will you please send a serviceman up here and install a meter that will stop the washer when it has been used for an hour?" she asked. "Then the boys will have to insert an additional quarter for further use."

TRADE NOTES

Dealers & Distributors

JARVIS ELECTRIC & REFRIGERATION CO., Vancouver, B. C., appliance store, has been purchased by George Firth, head of Firth Electric, Vancouver. Both businesses will continue at their old addresses and will operate under their original names.

HUGH M. DALE'S refrigeration and radio business in Vancouver, B. C., has been closed.

MACKENZIE WHITE & DUNSMUIR, Vancouver, B. C., distributor, has opened in Kamloops its eighth branch warehouse. R. Parker, assistant manager of the New Westminster branch for the past four years, is manager of the new warehouse.

QUESNEL (B.C.) RADIO & ELECTRIC is operating on the premises of Cowan Hardware Co. until its building, recently gutted by fire, is rebuilt.

MEIKLE ELECTRIC & RADIO, LTD., is a new Vancouver, B. C., dealer in electrical supplies.

MERCHANTS ELECTRIC & EQUIPMENT CO. is the new name of Glenn C. Willis Electric Co., Los Angeles.

BARBER MUSIC CO., Great Falls, Mont., has taken on distribution of the Crosley refrigerator and radio.

SPOKANE (WASH.) PAPER & STATIONERY CO. has been named distributor for the new Philco refrigerator.

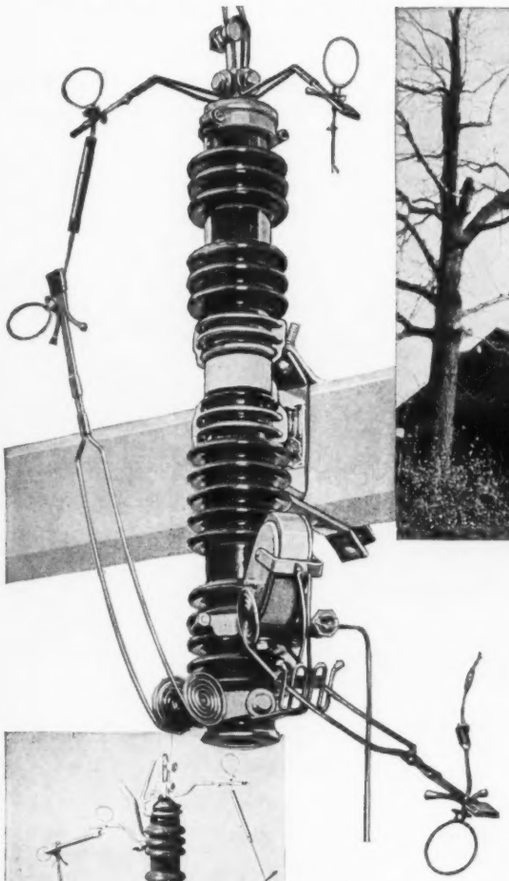
Manufacturers

GARNETT YOUNG AND CO. has been appointed representative in Washington, Idaho, Nevada, Arizona, California and Hawaii for Steber Mfg. Co., maker of all-purpose lighting equipment.

LINCOLN ELECTRIC CO., manufacturer of arc-welding equipment, has opened a branch office in Seattle. J. B. McCormick, who recently represented the company in Spokane, will be in charge.

WESTINGHOUSE ELECTRIC & MFG. CO. was host on Feb. 28 to the Northern California Purchasing Agent's Assn. on an inspection tour of the Emeryville, Calif., manufacturing service and porcelain plants. This was the first time

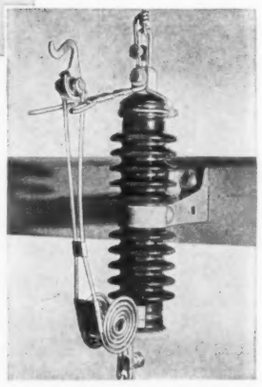
PROVE TO YOURSELF — HOW TO GET BETTER SERVICE



This triple-link, with one fuse cartridge blown, shows definitely that a fault has been cleared—service quickly restored—equipment protected—a patrol saved.

COMBINATION TRIP-O-GAP AND TRIP-O-LINK SWITCH

Now—before severe lightning damages expensive equipment—install inexpensive Trip-O-Gap Trip-O-Links right on transformer to positively ground discharges. Ratings—5 and 7.5/12.5 KV, 50 amperes.



TRIP-O-DISCONNECTS — *The ideal, inexpensive disconnect for signal, high line telephone circuits rural lines—lines for ratings—5, 7.5/12.5 and 15 KV, 75 amperes.*

with these KEARNEY TRIP-O-LINKS

GIVE the same sort of efficient service to your rural customers as you do to those in urban districts — by installing genuine, inexpensive Kearney Trip-O-Links, Trip-O-Link Trip-O-Gap and Trip-O-Disconnect Switches . . . Each of these switches is revolutionary in design — simple in construction — the result of careful engineering research that has solved your problem of providing efficient protection to your equipment in rural districts where operating budgets are low.

Over a period of years, many operating men have discovered the money-saving advantages of these switches . . . You can learn the advantages, too. Place a trial order . . . Try these switches . . . If they don't meet your approval and satisfaction — send them back . . . We'll refund your money if you say these switches aren't O K — and then some.

Take advantage of this profitable offer — Ask a Kearney representative to show you this popular line of switches or

write for prices and descriptions

ASK FOR LATEST BULLETIN SHEET NOT INCLUDED IN BULLETIN 312

Exclusive Sales Representatives

MAYDWELL & HARTZELL

INCORPORATED

LOS ANGELES • SAN FRANCISCO • PORTLAND

EXCLUSIVE DISTRIBUTORS

GRAYBAR ELECTRIC CO. Seattle, Portland, Tacoma, Spokane • WESTINGHOUSE ELECTRIC SUPPLY CO., Phoenix • J. R. BRADLEY CO. Reno

arrangements had been made for such a tour since completion of the $250,000 extension of the manufacturing building.

Contractors

JOHN DICK, Duncan, B. C., electrical contractor, has completed rewiring and installation of fixtures in a local restaurant.

MOTT ELECTRIC, New Westminster, B. C., has completed the wiring work in connection with alterations of the Hamley Block, New Westminster.

LEWISTOWN (MONT.) ELECTRIC SUPPLY Co. has completed the lighting installation for the Fox Judith Theater.

Moved

MARK G. MUELLER, representative in Colorado, western Nebraska, northern New Mexico and Wyoming for Ward Leonard Electric Co., to 1644 Blake St., Denver.

CAPITOL ELECTRIC Co. from 2489 Shattuck Ave., Berkeley, Calif., to 1812 Carlton St.

R. G. HARRIS, of Maydwell & Hartzell, San Francisco, to Portland, where he will represent the company.

GEORGE L. BLACK, San Bernardino, Calif., contractor, from 455 Fourth St. to 425 Court St.

APPLETON ELECTRIC Co.'s Los Angeles office to 100 North Santa Fe Ave.

MONTGOMERY BROS., manufacturers' representatives, from 912 East Third St. to 420 South San Pedro St., in Westinghouse Electric Mfg. Co.'s building, Los Angeles. The company has also added 3,000 sq. ft. of warehouse space.

ABOUT PEOPLE

Southwestern LAEI Names General Committees

Appointed last month were the 1939 general committees of the Southwestern Section, IAEI. They are:

Articles of association—H. V. Dobson, chairman; F. A. Short, H. G. Ufer; California State Safety Orders— G. E. Kimball, chairman; W. E. Brothers, E. H. Snedaker, E. M. McLaughlin; civil service—O. W. Newcomb, chairman; F. H. Vore, I. E. Bartlett; clearing house—R. W. Wiley, chairman, C. E. Hardy, R. H. Manahan, H. L. Gerber.

Code coordinating—Ufer, chairman; Short, J. C. Peterson; investigation of electrical fires and accidents—C. T. Coyle, chairman; Short, Wiley, Manahan, Hardy, Kimball; legislative—Manahan, chairman; G. E. Price, McLaughlin; ordinance—A. C. Veit, chairman; A. J. Kay, C. E. Heise; membership—A. E. Johnstone, chairman; A. E. Cohn, E. H. Collins; Pacific Coast Building Conference (joint committee)—H. E. Robinson, chairman; O. Barnwell, J. I. Dixon; publicity and public relations—W. A. Cyr, chairman; V. H. Hartley. H. M. Stewart, J. W. Rose, Ufer, Coyle.

A. E. PIERCE has been named sales manager of Sierra Pacific Power Co., succeeding Fred G. Hodge, who has resigned to become associated with Portland General Electric Co. Pierce was formerly supervisor of district representatives for Blackstone Valley Gas & Electric Co., Pawtucket, R. I. Joining that company 14 years ago as an office boy, he held various positions in the sales department before coming to Reno.

Elmer E. Kime Appointed West Coast Power Manager

Elmer E. Kime has been appointed manager of West Coast Power Co. He will have charge of all properties in the western part of the system, from Reedsport, Ore., to Shelton, Wash.

The appointment relieves W. C. MacInnes, president of the company, from operating routine and permits him to spend his entire time as executive head of the three operation companies, West Coast Power Co., California Public Service Co. and Western States Utilities Co.

Kime has been identified with the utility business since 1916, when he was in charge of the electrical operations of Nevada Consolidated Copper Co. He served subsequently with Arizona Power Co., in charge of steam and hydro operations, and with Needles (Calif.) Gas & Electric Co. as manager. In 1932 he came to West Coast Power, and since that time has served as division manager in both eastern and western properties.

J. HENRY EHLERS, an employee of Utah Power & Light since 1922, when he started work as an electrical engineer, has been appointed sales supervisor for the company in Salt Lake City. He succeeds Verd W. Edwards.

V. T. RUPP, Los Angeles, and Perry B. Miller, Oakland, have been named southern and northern California factory representatives for F. A. Smith Mfg. Co.

Westinghouse Makes Five Personnel Changes

Westinghouse personnel changes include the following:

Verd W. Edwards, formerly connected with Utah Power & Light Co., has joined the sales force of the Westinghouse lamp division, Salt Lake City. H. L. Bargion Jr., has been transferred from Westinghouse Electric Supply Co., Sacramento, to the sales force of Westinghouse lamp division, Portland.

U. C. Walk, formerly with Pacific Gas and Electric Co., is now a member of the sales force of Westinghouse lamp division, San Francisco. J. L. Casey, a member of the Westinghouse lamp division organization for the past 17 years in the Washington-Oregon territory, has been transferred to San Francisco.

P. B. Garrett, for the past year Salt Lake City engineering representative for Westinghouse, has been moved to Chicago.

L. M. K. BOELTER, professor of electrical engineering at the University of California, is a member of the new committee on research of the American Society of Heating & Ventilating Engineers. He has been carrying on a project study of cooling towers and evaporative condensers.

P. G. TIREY, E. K. Barnham and E. N. Ostler have joined Maycock Appliance Co., Provo, Utah, as salesmen.

R. B. GASKARTH, of Burnaby, B. C., has been elected president of the New Westminster & Fraser Valley Electrical Assn. H. Best is secretary-treasurer. Past President Lance Robson is the association's representative in the executive council of the Vancouver Electrical Assn.

GEORGE E. KELLEY, dealer promotion representative for Portland General Electric Co., has been elected president of the Portland Electric Club.

Chlanda Becomes Head Of New RMEL Affiliate

Voting unanimously to apply for membership in the Rocky Mountain Electrical League, Greeley, Colo., dealers last month elected R. F. Chlanda, manager of Harrison Inglefield, president of the local group.

L. L. Dauth, Home Gas & Electric Co., was named secretary-treasurer. Mose Stone, O. S. Herdman and Richard Waters are directors.

First major effort of the new organization will be a three-day electrical exposition.

Pacific Power Shifts Sales Heads in Three Districts

Changes of sales supervisors in three Pacific Power & Light Co. districts have been announced by D. B. Leonard, commercial manager.

Ralph H. DeBeaumont has been transferred from The Dalles, Ore., to Walla Walla, Wash., to replace Buell Throop, who has resigned after 12 years to engage in the construction business in Walla Walla.

The Dalles post has been filled by George Edmiston, of Astoria, Ore. H. T. Ward has been advanced to district sales supervisor at Astoria.

LORNE A. CAMPBELL, vice-president and general manager of West Kootenay Power & Light Co., Rossland and Trail, B. C., has been elected president and managing director to succeed the late J. J. Warren. Ross H. McMaster, of Montreal, has replaced Campbell. The company is the generation and distribution end of Consolidated Mining & Smelting Co., Trail.

HARVEY B. JORDAN, formerly assistant vice-president of American Steel & Wire Co., subsidiary of U. S. Steel, has been appointed vice-president in charge of operations. He was educated in San Diego public schools.

R. B. BRAGG, manager of Pacific Power & Light Co.'s Walla Walla district since 1924, has been appointed district manager at Yakima, Wash. He succeeds the late Lisle R. Sheeley. W. H. Till, formerly manager of the new industries department, succeeds Bragg at Walla Walla.

BEN HILL, for many years chief inspector of the City of Oakland's electrical department, has been appointed superintendent, succeeding the late Carl Hardy. Hill is chairman of the Northern California Chapter, IAEI, and served one year as president of the Southwestern Section.

R. E. BRENNAN, formerly general auditor for Portland General Electric Co., has been appointed comptroller to serve in the capacity of executive accounting officer and to perform special duties required by the president. Lester G. Park succeeds him as general auditor.

CARL SCHIFFERS, president last year of the Pacific Service Employees' Assn., employee organization of Pacific Gas and Electric Co., has joined Hawaiian Electric Co., Honolulu. He will be in the personnel department, where he will direct employee activities.

THEY GO FOR YOU!
A product of the General Electric Company for more than 45 years, General Electric Fans are known the world over for their high-quality construction, efficient operation, and long life.
And because General Electric Fans are dependable, we back them up with what we believe to be the most liberal service policy in the fan industry—a service policy that provides immediate and free replacement of any G-E Fan found defective in material or workmanship during the warranty period.
Carry General Electric Fans this year and enjoy the profit opportunity extended you by the best known and most complete line of high-quality fans in the industry. You go for them—and they'll go for you!
Have you seen the unique G-E Fan Portfolio, "LET'S GET DOWN TO BRASS TACKS"? The salesman of your nearest General Electric Fan Distributor has a copy. Ask to see it when he next calls. You'll find it chock-full of sound advice!
Let's Get Down to
BRASS TACKS
GENERAL ELECTRIC
FANS
APPLIANCE AND MERCHANDISE DEPARTMENT
GENERAL ELECTRIC CO., BRIDGEPORT, CONN.
GENERAL ELECTRIC

Fresno Engineers' Club Elects Bragg President

A. D. Bragg, sales engineer for General Electric Co., Fresno, Calif., was last month elected president of the Engineers' Club of Fresno. He succeeds Claude H. Weekes, superintendent of the Fresno Water Dept.

Named vice-president was R. D. Likely, superintendent of operations of San Joaquin Power; secretary-treasurer, T. A. Bettersworth. Directors are William Haire, A. H. Shields, R. R. Richey and Frank C. Paiva.

GEORGE MILLER, president of Jarvis Electric Co., Vancouver, B. C., has been elected chairman of the Vancouver Town Planning Commission.

ROY S. BRACE, Pasadena, Calif., dealer, has been elected chairman of the Pasadena Electrical Dealers' Assn. Clayton Russ is secretary.

GEORGE E. MACDONALD, president of MacDonald's Electric, Victoria, B. C., contractor, has been elected director of the Victoria Island Publicity Bureau.

HARRY J. BAUER, president of Southern California Edison Co., has been reelected president of the Automobile Club of Southern California.

W. H. TAUBERT, for the past eight years sales manager of the insulation division of Corning Glass Works, has joined Phelps Dodge Copper Products Corp.

H. PAUL MELLIGAN, vice-president and general counsel, and Morton Gilde, general sales manager, both of Easy Washing Machine Corp., visited the West last month on a business trip.

Fleming Chosen to Head Butte Appliance Group

Martin Fleming, of Ellis Paint Co., was last month elected president of the Butte (Mont.) Electrical Appliance Assn. H. A. Doyer, Dreibelbis Co., is vice-president; Tom Kirby, Bertoglio-McTaggart's, secretary-treasurer.

Appointed to the committee in charge of arrangements for the association's annual electrical show this month were: William K. Kuhn, Carl Shiner, A. B. Foutz, Doyer, J. J. Kirby, W. E. Slauson, Leonard Waters and W. N. Divine.

EARL BROWER has been appointed manager of the newly enlarged major electric-appliance division of Hopper Kelly Co., Seattle. Brower has been selling in Seattle for several years.

LLOYD R. HANLON, who recently resigned from the district managership of Anaconda Wire & Cable Co. in the Los Angeles and Arizona territory, a position he held for ten years, is opening his own manufacturers' agency in Los Angeles.

PAUL ANDERSON, formerly with the Los Angeles office of Westinghouse Electric Supply Co., sailed from Los Angeles March 17 to become a member of Hawaiian Electric Co.'s sales department in Honolulu.

W. E. PARNUM, B. C. Electric Railway Co. display manager, has been elected chairman of the Vancouver Displaymen's Club.

Deaths

F. S. MYRTLE, 79, former publicity manager of Pacific Gas and Electric Co., died in February. Born in England, Mr. Myrtle served many years on various San Francisco newspapers. He went to P.G.&E. in 1912 as publicity manager, a position he held until his retirement April 1, 1938. Later he was also editor of the company's *Pacific Service Magazine*, which was discontinued in 1932. A member of the PCEA, Commonwealth Club and Bohemian Club, he at one time wrote a Grove play for the latter.

THOMAS A. PANTER, 61, engineer in charge of electrical operations for the Los Angeles Water & Power Dept. and recently serving as chief engineer of the joint Congressional committee to investigate the TVA, died March 12 in Los Angeles of a heart attack following an appendectomy. Prior to his death, Mr. Panter returned to California from Washington after submitting his report to the committee. He had been connected with the power department in Los Angeles since its inception in 1908.

A. B. WOLLABER, 68, Southern California Edison Co.'s Pasadena district manager until his retirement in 1932, died March 7. Joining the company as assistant district agent in Los Angeles, he later served as manager in Long Beach, Santa Monica and San Bernardino. He was appointed Pasadena manager in 1919.

WILLIAM M. MCINTOSH, 54, material engineer in the operating department of Southern California Edison Co., died March 12 of heart disease. Before entering the Edison company's service in 1926, he was affiliated with New York Edison Co.

ELMER BURKE, lighting salesman for the San Francisco division of Pacific Gas and Electric Co., died March 7 after a long illness. An army captain during the war, he had spent most of the years since in lighting sales.

FRED B. HAAKE, 55, an old-timer in the Western electrical business, died last month. He had been with the old Pacific States Electric Co. and, until his death, with General Electric Supply Corp. for about 30 years. His work with the latter was on sales statistics.

STEPHEN G. CUNNINGHAM, 61, for 30 years purchasing agent of Southern Colorado Power Co., died of heart disease late in February. He joined the company as superintendent of the Victor, Colo., power plant.

DANIEL D. SULLIVAN, 74, owner of Sullivan Electric Co., Seattle, died Feb. 28. Mr. Sullivan had been actively engaged in the electrical retail business for 27 years.

GEORGE MARTIN, lighting salesman in Pacific Gas and Electric's San Francisco division, died Feb. 26. He had been in the lighting division for 12 or more years.

Speakers

Clark Baker, executive secretary, Sight Conservation Council of Northern California—before the Oakland City Schools Counselors' Club and the Elementary & High School Principals' Assn. of Oakland: "Classroom Conditioning for Classroom Seeing Tasks." Also before the Solano County School Trustees' Assn. and the Rural Teachers' Assn.: "Science of Seeing in Classrooms."

At the 48th anniversary banquet of Tull & Gibbs, Spokane furniture and appliance store — Charles Hebberd, president; Guy S. Hebberd, secretary-treasurer; L. K. Vallandingham, department manager; Frank Topping, northwest district manager of Kelvinator; G. A. Lieser, western manager of Monarch Range Co.; Sidney A. Beck, northwestern manager of Estate Stove Co.

R. C. McFadden, sales manager, Southern California Edison Co.—at the Edison Electric Institute national sales conference in Chicago, March 20-24: "Load Building with Kitchen Equipment" and "Industrial Sales in Intermediate Areas."

J. F. Lincoln, president, Lincoln Electric Co., Cleveland—before the Los Angeles Chamber of Commerce.

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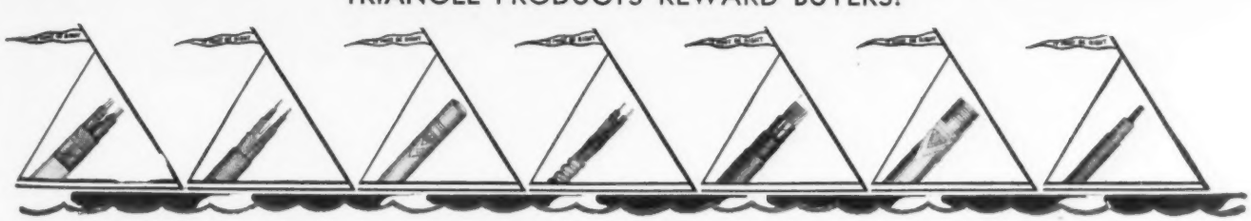
Specify!

TRIANGLE RIGID CONDUIT

HOT DIP GALVANIZED!

Plus A Baked-On Lacquer Finish!

TRIANGLE PRODUCTS REWARD BUYERS!

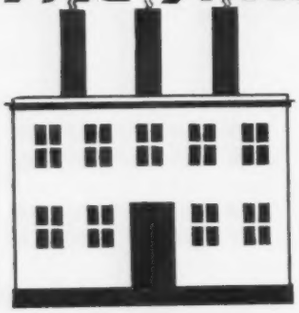


TRIANGLE CONDUIT & CABLE COMPANY, INC.

Horace Harding and Queens Blvds.
Elmhurst, New York City, N. Y.

Pacific Coast Division: C. C. Hillis, Vice-President in Charge of Sales, 390 Seventh St., San Francisco, California

The Manufacturers' Directory



● In these pages is a directory of electrical manufacturers, their Western offices and Western representatives—a valuable source of buying information to the subscribers of ELECTRICAL WEST. It is as accurate and complete as the publishers could make it; no charge is made for a listing and every manufacturer operating in this territory is privileged to be included. ELECTRICAL WEST does not guarantee the information, however, and assumes no responsibility for errors or omissions. Subscribers are respectfully requested to notify the publishers of any corrections or additions that should be made.

● Under each manufacturer are listed the Western branch offices or representatives. Where such information is not listed, the manufacturer has no representation in the territory or has reported none. If the distribution of a product is through wholesalers only, this also is indicated. To use the directory, find the manufacturer's listing and call upon the nearest branch office or agent. If the name of the manufacturer is not known, turn to the "Where to Buy It in the West" guide immediately following and look under the name of the product in which you are interested.

A-A ELECTRIC MFG. CO., THE, Bridgeport, Conn.—Alexander W. Bromberg, Los Angeles.

ABOLITE REFLECTOR CO., West Lafayette, Ohio—Jos. Paulson, Portland; H. J. Kjaer, San Francisco; W. E. Welborne, Los Angeles; W. E. Young, Denver.

ACCURATE MFG. CO., Garfield, N. J.—F. J. Airey Co., Los Angeles; Frank D. Fagan Co., San Francisco.

ADAM ELECTRIC CO., FRANK, St. Louis, Mo.—Zinsmeyer, Inc., Los Angeles; Fred E. Staible, Inc., Denver; Wm. R. Miller, Albuquerque.

AJAX ELECTROTHERMIC CORP., Trenton, N. J.—E. A. Wilcox Co., San Francisco; J. Max Lee Co., Los Angeles.

AIR & REFRIGERATION CORP., New York, N. Y.—Montgomery Bros., Seattle, Portland, San Francisco, Los Angeles.

ALBANY SALES CO., New York, N. Y.—D. E. Sanford Co., Seattle, San Francisco, Los Angeles.

ALLEN-BRADLEY CO., Milwaukee, Wis.—Garland-Affolter Eng. Corp., Seattle, San Francisco; Zinsmeyer, Inc., Los Angeles; Peterson Co., Denver.

ALLIANCE MFG. CO., Alliance, Ohio—D. L. Herman, Seattle; Gillan Sales Co., San Francisco, Los Angeles, Denver.

ALLIED MERCANTILE CO., THE, Irvington, N. J.—C. R. Hunt, San Francisco.

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis. — Western Branch Offices: Spokane, El Paso. Western District Offices: Seattle, Portland, San Francisco, Los Angeles, Denver, Salt Lake City, Phoenix.

ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa.—Sales Offices: Seattle, San Francisco, Los Angeles, Denver.

AMERICAN AUTOMATIC ELECTRIC SALES CO., Chicago, Ill.—District Offices: San Francisco, Los Angeles.

AMERICAN BLOWER CORP., Detroit, Mich.—Branch Offices: Seattle, Tacoma, Portland, San Francisco, Los Angeles, Salt Lake City, Denver.

AMERICAN BRASS CO., Waterbury, Conn.—A. W. Gruss, Dist. Mgr., San Francisco.

AMERICAN ELECTRIC CABLE CO., Holyoke, Mass.—James C. Pope, Jr., Los Angeles; Jack K. Montgomery, Denver.

AMERICAN ELECTRIC SWITCH CORP., Minerva, O.—R. C. James, Seattle; Alexander W. Bromberg, Los Angeles.

AMERICAN FELT CO., Chicago, Ill.—F. J. Klenck Co., Seattle, Portland, San Francisco, Los Angeles.

AMERICAN FLEXIBLE CONDUIT CO., New Bedford, Mass.—Albert S. Knight Co., Seattle; Walter S. Sweet, Los Angeles.

AMERICAN LAVA CORP., Chattanooga, Tenn. — Electric Material Co., San Francisco, Los Angeles.

AMERICAN MICROPHONE CO., INC., Los Angeles, Calif.

AMERICAN PHENOLIC CO., Chicago, Ill. — Don H. Burcham, Portland; J. P. Hermans, San Francisco.

AMERICAN SAFETY APPLIANCES CO., San Francisco, Calif.—Sold through leading electrical wholesalers.

AMERICAN SAFETY RAZOR CORP., Brooklyn, N. Y. — V. Strite (Geo. H. Eberhard Co.), San Francisco.

AMERICAN STEEL & WIRE CO., Cleveland, Ohio—Columbia Steel Co., Seattle, Portland, San Francisco, Los Angeles.

AMERICAN TRANSFORMER CO., Newark, N. J.—Jos. D. Sinnott, Seattle; H. B. Squires Co., San Francisco; Henger-Seltzer Co., Los Angeles; J. Ludvig Hansen, Denver.

AMERICAN WIRE DIV. OF THE ELECTRIC AUTOLITE CO., Port Huron, Mich.—Harry A. Lasure, Los Angeles.

ANACONDA WIRE & CABLE CO., New York City—Branch Offices: Seattle, San Francisco, Los Angeles. Leading wholesalers in all principal cities.

ANCHOR WEBBING CO., Pawtucket, R. I.—Marwood Limited, Seattle, Portland, San Francisco, Los Angeles.

ANDERSON BRASS WORKS, INC., Birmingham, Ala.—Waltham, De Witt & Krusi, San Francisco; Industrial Eng'g. & Equip. Co., Los Angeles; George L. Hoffman, Portland.

ANGELUS CHIMES CO., Los Angeles, Calif.—Frank D. Fagan Co., San Francisco.

APEX MFG. CO., Oakland, Calif.

APEX ROTAREX MFG. CO., Cleveland, O.—Pacific Coast Sales & Service, Oakland. Branch Offices: Seattle, Los Angeles, Denver; Harper-Meggee, Inc., Spokane, Portland; Home Elec. Co., Tacoma; Radio Studios, Salt Lake City.

APPLETON ELECTRIC CO., Chicago, Ill.—Branch Offices: San Francisco, Los Angeles, Seattle.

ARCO CO. OF CALIFORNIA, Los Angeles, Calif.—Insulating varnish only, Marwood Limited, Seattle, Portland, San Francisco, Los Angeles.

ARROW-HART & HEGEMAN ELEC. CO., The, Hartford, Conn.—District Offices: San Francisco, Los Angeles.

ARTISTIC LAMP MFG. CO., INC., New York, N. Y.—Clarke-Hoyt, Seattle; Fleming & Niswonger, San Francisco.

ASHEVILLE MICA CO., Biltmore, N. C.—Marwood, Ltd., Seattle, Portland, San Francisco, Los Angeles.

ATWOOD & MORRILL CO., Salem, Mass.—Ray Smythe, Portland; Oliver B. Lyman, San Francisco; A. W. Anderson, Los Angeles.

AUTOMATIC ELECTRIC CO., Chicago, Ill.—Branch Offices: Seattle, San Francisco, Los Angeles.

AUTOMATIC ELEC. MFG. CO., Mankato, Minn.—Factory Reprs.: Jack E. Way, Seattle; Ralph B. Clapp, Los Angeles. Distributors: (Time Switches) Garland-Affolter Eng'g Co., Seattle, Portland, San Francisco, Los Angeles. (Sign Industry) Decla Sales Co., Seattle, Portland, San Francisco, Los Angeles.

AUTOMATIC WASHER CO., Newton, Ia.—Dist. Mgrs.: Garrett Lowman, Seattle; C. J. Reid, Los Angeles; R. D. Wilson, Denver; W. D. Brock, Phoenix.

BABCOCK & WILCOX CO., New York City—C. C. Moore & Co., Seattle, Portland, San Francisco, Los Angeles, Phoenix; Harry Y. Byers, Denver.

BARKELEW ELECTRIC MFG. CO., Middletown, Ohio—Electrical Specialty Co., Seattle, San Francisco, Los Angeles.

BARTLETT MFG. CO., Detroit, Mich.—Geo. E. Honn Co., San Francisco; Joslyn Co. of Calif., Los Angeles; Line Material Co., Graybar Elec. Co., General Elec. Supply Corp.

BARTLETT HAYWARD DIV., KOPPERS CO., Baltimore, Md.—F. W. Stevens, Portland; Oliver B. Lyman, San Francisco; A. W. Anderson, Los Angeles; Shubart & Schloss, Denver.

BARTON CORP., THE, West Bend, Wis.—H. W. Randall, Div. Mgr., Oakland; Harry Oster & Co., Los Angeles.

BELDEN MFG. CO., Chicago, Ill.—Wallace R. Lynn Co., San Francisco.

BENJAMIN ELECTRIC MFG. CO., Des Plaines, Ill.—Miles F. Steel, Vice Pres., Western Div., San Francisco. Sold exclusively through elec'l wholesalers. Dist. Reprs.: A. C. Sutter, Seattle; M. L. Fowler, Los Angeles; R. Ackerman, Salt Lake City.

BETTS & BETTS MFG. CO., New York City—Panama Lamp & Com'l. Co., San Francisco; Rapid Appliance Co., Los Angeles.

BIDDLE CO., JAMES G., Philadelphia, Pa.—Quality Electric Co., Ltd., Los Angeles.

BLACKBURN PRODUCTS CORP., JASPER, St. Louis, Mo.—Burton R. Stare, Seattle; Wm. J. Cot-

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Henger Seltzer Co.	130 S. Hewitt St. Los Angeles
Jos. D. Sinnott	1203 Western Av. Seattle, Wash.
J. Ludvig Hansen	University Bldg. Denver, Colo.

ANDERSON BRASS WORKS, Inc.
ELECTRICAL DISTRIBUTION FITTINGS
and
CONNECTORS OF ALL KINDS
SALES OFFICES:
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GEORGE L. HOFFMAN — 210 N. W. Eleventh Avenue, Portland, Oregon
INDUSTRIAL ENGINEERING & EQUIPMENT CO.—Subway Terminal Bldg., Los Angeles, Calif.

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trell, Portland; Geo. E. Honn Co., San Francisco; W. W. Kirk Co., Los Angeles; L. Vernon Wilson, Phoenix.

BLACKBURN SPECIALTY CO., Cleveland, O.—H. B. Squires Co., Seattle, San Francisco, Los Angeles.

BLACKSTONE MFG. CO., INC., Jamestown, N. Y.—Bon Marche, Seattle; Dohrmann Com'l Co., San Francisco; Geo. S. Conley, Denver; Hansen Distr. Co., Salt Lake City.

BOSS WASHING MACHINE CO., Cincinnati, Ohio—Domestic Appliance Co., Seattle; Gordon E. Wilkins Co., Oakland.

BOWIE SWITCH CO., San Francisco, Calif.—Thomas S. Wood, Seattle; R. M. Small, San Francisco; W. D. Howze, Los Angeles; Paul A. Douden & Co., Denver.

BRAMMER MFG. CO., Davenport, Ia.—W. C. Rice Co., San Francisco; C. W. Thode, Los Angeles.

BRANNON INCORPORATED, Detroit, Mich.—C. W. Thode, Los Angeles.

BREWER-TITCHENER CORP., THE, Cortland, N. Y. — Sold through insulator mfrs.

BRIGHT LIGHT REFLECTOR CO., Brooklyn, N. Y.—Northwest Sales Co., Portland; I. H. Pope Co., San Francisco, Oakland; J. G. Kirkpatrick, Los Angeles; R. F. Hamilton, Denver.

BRIGHT STAR BATTERY CO., Clifton, N. J.—L. B. Lamar, Seattle; W. F. Holmes, San Francisco.

BRISTOL COMPANY, THE, Waterbury, Conn.—R. G. Tower, Pacific Coast Manager, San Francisco. Branch Offices: Seattle, San Francisco, Los Angeles.

BROWN COMPANY, New York City—Earl Van Pool, Dist. Mgr., San Francisco; Westinghouse Elec. Supply Co., all principal cities; Electric Supplies Dist. Co., San Diego.

BROWNING MFG. CO., Maysville, Ky.—Marwood Limited, Seattle, Portland, San Francisco, Los Angeles; Electric Motor Shop, Fresno.

BRYANT ELECTRIC CO., THE, Bridgeport, Conn.—F. C. Scharr, Dist. Mgr., San Francisco. Dist. Offices: Seattle, San Francisco, Los Angeles, Huntington Park.

BUCKINGHAM, W. H., Binghamton, N. Y.—Western Hardware & Tool Co., Ned Licht Co., San Francisco; Utah Safety Supply Co., Salt Lake City.

BUFFALO FORGE CO., Buffalo, N. Y. — A. T. Forsyth, Seattle; J. G. Scott (Moore Machy. Co.), San Francisco; P. R. Adrianse, Los Angeles.

BULL DOG ELECTRIC PRODUCTS CO., Detroit, Mich.—Coast Electric & Mfg. Co., Portland; Safety Switchboard & Mfg. Co., San Francisco; Mullenbach Elec'l. Mfg. Co., Los Angeles.

BULLARD CO., E. D., San Francisco, Calif.—Branch Offices: Seattle, Los Angeles, Salt Lake City, Houston.

BURDICK CORP., THE, Milton, Wis.—Al Bush Elec. Co., San Francisco; Kelly-Koett X-Ray Co., San Francisco, Los Angeles.

BURGESS BATTERY CO., Freeport, Ill.—District Offices: Portland, Denver; Dan J. Rudat, San Francisco; V. T. Rupp, Los Angeles.

BURKE ELECTRIC CO., Erie, Pa. —Burton R. Stare, Seattle; Oliver B. Lyman, San Francisco; Otto Demmert, Los Angeles.

BURNDY ENGINEERING CO., New York City.—F. W. Carlson, Seattle; C. E. Ingalls, San Francisco; Condon & Young, Los Angeles; Peterson Co., Denver.

BURNLEY BATTERY & MFG. CO., North East, Pa.—Joslyn Co. of California, San Francisco, Los Angeles.

BUSSMANN MFG. CO., St. Louis, Mo.—A. J. Cole. Pacific Coast Mgr., Los Angeles; District Offices: Seattle, San Francisco, Los Angeles.

CALIFORNIA CORRUGATED CULVERT CO., Los Angeles, Berkeley, Calif.—Washington Corrugated Culvert Co., Seattle, Spokane; Pure Iron Culvert Mfg. Co., Portland; The R. Hardesty Mfg. Co., Denver, Salt Lake City, Albuquerque; Western Metal Mfg. Co., Phoenix.

CANNON ELEC. DEVELOPMENT CO., Los Angeles, Calif.—James J. Backer Co., Seattle; H. H. Van Luven (signal and power equip.) Los Angeles; Graybar Elec. Co., (sound equip., cable connectors), Los Angeles.

CARBOLOY CO., Detroit, Mich.—Sales Representatives: Fred Robbins, Portland; J. W. Doody, Los Angeles.

CARRIER MICROPHONE CO., Inglewood, Calif.

CENTURY ELECTRIC CO., St. Louis, Mo.—Branch Offices: Seattle, Spokane, San Francisco, Los Angeles, Denver, Salt Lake City, Dallas, Houston.

CHANCE CO., A. B. Utilities and Tips Tool Divisions, Centralia, Mo.—Joslyn Co. of Calif., Los Angeles, San Francisco; Hubbard and Company, General Elec. Supply Corp., Westinghouse Elec. Supply Co., San Francisco; Utilities Supply Co., Los Angeles.

CHAPMAN VALVE MFG. CO., THE, Indian Orchard, Mass.—Branch Offices: San Francisco, Los Angeles.

CHASE BRASS & COPPER CO., INCORPORATED, Waterbury, Conn.—Branch Offices: Seattle, San Francisco, Los Angeles.

CHESLER & SONS CO., J., Brooklyn, N. Y.—O. W. Coombs Sales Co., Los Angeles.

CHICAGO FLEXIBLE SHAFT CO., Chicago, Ill.—Representatives in: Seattle, San Francisco, Los Angeles, Salt Lake City.

CHICAGO PNEUMATIC TOOL CO., New York City—H. P. Hansen, Mgr., San Francisco.

CHICAGO SIGNAL CO., THE, Chicago, Ill.—Garnett Young & Co., Seattle, San Francisco, Los Angeles.

CINCINNATI ELEC. TOOL CO., Cincinnati, Ohio—Fred E. Wissing, San Francisco.

CIRCLE F MFG. CO., Trenton, N. J.—Gillette & McLaren, Inc., Seattle, Portland; Keeler, White Co., San Francisco; A. W. Bromberg, Los Angeles.

CLARK BROS. BOLT CO., Milldale, Conn.—J. D. French Co., San Francisco; Earl E. Tibbot Co., Los Angeles.

CLARK CONTROLLER CO. (Sundh Elec. Co.), Cleveland, O. —Burton R. Stare, Seattle; Oliver B. Lyman, San Francisco; Mullenbach Elec'l Mfg. Co., Los Angeles; Bull Dog Mfg. Co., Denver.

CLARK, JR., ELECTRIC CO., JAS., Louisville, Ky. — H. H. Hoffman, Seattle; Zonne Electric Tool Co., Los Angeles.

CLEMENTS MFG. CO., Chicago, Ill.—D. E. Sanford Co., Seattle, San Francisco, Los Angeles.

CLIFTON CONDUIT CO.—Hatheway & Co., Distributors, New York City—Northwestern Agencies, Seattle; Northwest Sales Co., Portland; Jas. J. Noble Co., San Francisco; Electric Sales Co., Los Angeles.

CLIFTON MFG. CO., Boston, Mass.—Geo. E. Honn Co., San Francisco; Bacon-Cooper Co., Denver.

CLIPSHAVE, INC., Port Chester, N. Y.—C. C. Smoot Co., San Francisco.

COAST ELECTRIC MFG. CO., Portland, Ore.

COHOES ROLLING MILL CO., Cohoes, N. Y.—Branch Office, Los Angeles.

COLE & CO., INC., C. W., Los Angeles, Calif.—R. S. Prussia, San Francisco; RA-O-LITE Co., Ltd., Honolulu.

COLLYER INS. WIRE CO., Pawtucket, R. I.—Allied Industries, Inc., Seattle, Portland, San Francisco, Los Angeles; Maydwell & Hartzell, Inc., Portland, San Francisco, Los Angeles.

COLONIAL PREMIER CO., Chicago, Ill.—John Maddox, San Francisco.

COLT'S PATENT FIRE ARMS MFG. CO., Hartford, Conn.—The Frank H. Bran Co., San Francisco, Los Angeles.

COLUMBIA ELEC. MFG. CO., Cleveland, Ohio.—Geo. E. Honn Co., San Francisco.

COLUMBIA METAL BOX CO., New York, N. Y.—Geo. A. Gray Co., San Francisco.

COMMERCIAL ENCLOSED FUSE CO., Hoboken, N. J.—Geo. H. Curtiss Co., San Francisco; Rosse M. Gilson, Los Angeles.

COMMONWEALTH ELECTRIC & MFG. CO., Boston, Mass.—Montgomery Bros., Seattle, Portland, San Francisco, Los Angeles.

CONSOLIDATED LAMP WORKS, Lynn, Mass.—Panama Lamp & Com'l Co., San Francisco, Los Angeles.

CONNECTICUT HARD RUBBER CO., THE, New Haven, Conn.—Ned Licht, San Francisco.

CONOVER CO., THE, Chicago, Ill. —C. C. Smoot, San Francisco; Wm. P. Swartz, West Los Angeles; Gaylord Hoyt, Los Angeles; P. A. Douden and Hendrie & Bolthoff, Denver.

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CRAMER & CO., R. W., New York City—Maydwell & Hartzell, Inc., San Francisco, Portland, Associated Sales Engineers, Los Angeles.

CRESCENT INS. WIRE & CABLE CO., Trenton, N. J.—Hodges & Glomb, San Francisco; Henger-Seltzer Co., Los Angeles.

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TREE TRIMMING EQUIPMENT
Bartlett Manufacturing Co.

FRICTION AND RUBBER TAPES
Clifton Manufacturing Co.

BURNHAM SAFETY LINE TOOLS
Burnham Line Tool Co.

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CROCKER-WHEELER ELEC. MFG. CO., Ampere, N. J.—Branch Offices: San Francisco, Seattle. TOAST-O-LATOR: D. E. Sanford Co., Seattle, San Francisco, Los Angeles.

CROUSE-HINDS CO., Syracuse, N. Y.—Sales Offices: Seattle, San Francisco, Los Angeles.

CRYSTALITE PRODUCTS CO., Glendale, Calif. — Maydwell & Hartzell, Inc., San Francisco, Los Angeles, Portland; Associated Wholesale Elec. Co., Elec'l Products Corp., Los Angeles; Smoot-Holman Co., Inglewood, Calif.; National Theatre Supply Co., principal cities.

CURTIS LIGHTING, INC., Chicago, Ill.—W. K. Turner, Seattle; R. M. Camnitz, Portland; John D. Erikson, San Francisco; A. J. Bassett, Huntington Park, Calif.; G. S. Spangler, Denver.

CUTLER-HAMMER, INC., Milwaukee, Wis.—Branch Offices: Seattle, San Francisco, Los Angeles.

DAY-BRITE REFLECTOR CO., St. Louis, Mo.—Allied Industries, Inc., Seattle, Portland; John D. Erikson, San Francisco; Illuminating Co., Los Angeles; Fred E. Staible, Inc., Denver.

DAYTON ELECTRIC MFG. CO., Chicago, Ill.—W. W. Grainger, Inc., Seattle, San Francisco, Los Angeles.

DE LAVAL SEPARATOR CO., New York City—De Laval Pacific Co., San Francisco.

DELTA ELECTRIC CO., Marion, Ind.—Wallace R. Lynn Co., Seattle, San Francisco, Los Angeles.

DICKE TOOL CO., Downers Grove, Ill.—Maydwell & Hartzell, Inc., San Francisco, Los Angeles, Portland.

DIEHL MANUFACTURING CO., Elizabethport, N. J.—H. B. Squires Co., Seattle, San Francisco; E. Zinsmeyer, Los Angeles.

DOLPH CO., JOHN C., Newark, N. J.—Joslyn Co. of Calif., San Francisco, Los Angeles; Leonard S. Foley, Portland; Urquhart Service, Denver, Salt Lake City.

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DOMINION ELEC'L. MFG. CO., Mansfield, O.—T. R. Sledding, Seattle; Wm. P. Horn Co., San Francisco; J. R. Shipp, Los Angeles.

DONGAN ELECTRIC MFG. CO., Detroit, Mich.—Preferred Equipment Co., Seattle; H. H. Van Luven, Los Angeles.

DRIVER CO., WILBUR B., Newark, N. J.—Marwood Ltd., Seattle, Portland, San Francisco, Los Angeles.

DRIVER-HARRIS CO., Harrison, N. J.—Electrical Specialty Co., Inc., Seattle, San Francisco, Los Angeles.

DUNCAN ELEC. CO., Lafayette, Inc. — Eicher & Bratt, Seattle; A. F. Blecksmith, Los Angeles; Paul A. Douden, Denver; H. E. Holland, Salt Lake City.

DURAKOOL, INC., Elkhart, Ind.—Gillette & McLaren, Seattle; H. E. Fricke, Seattle; C. R. Hunt, San Francisco; Geo. Colton, Oakland.

EASTERN SPECIALTY CO. ,THE, Philadelphia, Pa.—Ken. H. Best, Seattle; A. F. Blecksmith, Los Angeles.

EASY WASHING MACHINE CORP., Syracuse, N. Y.—F. S. Fenton, Jr., Dist. Mgr., San Francisco.

EDISON, INC., THOMAS A., Orange, N. J.—Branch offices: Seattle, San Francisco, Los Angeles; Denver, Salt Lake City.

EDISON GENERAL ELEC. APPLIANCE CO., INC., Chicago, Ill.—Branch Offices: Seattle, San Francisco, Los Angeles.

EDWARDS AND COMPANY, INC., Norwalk, Conn.—F. A. Strohecker, Seattle; Geo. A. Gray Co., San Francisco; J. G. Pomeroy Co., Los Angeles; Bacon-Cooper Co., Denver; O. T. Jenkins Co., Dallas.

ELECTRIC AIR HEATER CO., Mishawaka, Ind.—Fred W. Carlson, Seattle; Wm. Moon, Oakland; Harry E. Haldeman, Inc., Los Angeles.

ELECTRIC CONTROLLER & MFG. CO., THE, Cleveland, O.—J. C. McDougall, Seattle; T. R. Routh Co., San Francisco; Thomas Machinery Co., Los Angeles; J. B. Ambler, Denver; Riter Eng'g. Co., Salt Lake City.

ELECTRIC FURNACE CO., THE, Salem, Ohio—Thomas Machinery Co., Los Angeles.

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ELECTRIC MACHINERY MFG. CO., Minneapolis, Minn.—W. C. King, West Coast Mgr., Los Angeles; H. S. Emanuels, Seattle; Ray Smythe, Portland, Salt Lake City; Paul S. Everley, San Francisco; Mark G. Mueller, Denver; Tinling & Powell, Spokane.

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Standard Transformer Company
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Industrial Jewel Company, Inc.
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ELECTRIC SPECIALTY CO., Stamford, Conn.—Electrical Specialty Co., Seattle, San Francisco, Los Angeles.

ELECTRIC SPRAYIT CO., THE, Milwaukee, Wis. — Fred Brumbaugh, Portland; Leland E. Green, San Francisco; E. C. Lipshield, Los Angeles.

ELECTRIC STORAGE BATTERY CO., THE, Philadelphia, Pa.—Branch Offices: Seattle, San Francisco, Los Angeles, Denver.

ELECTRIC VACUUM CLEANER CO., INC., Cleveland, O.—Premier Division Offices: San Francisco, Oakland, Los Angeles.

ELECTRICAL ENGINEERS EQUIP. CO., Melrose Park, Ill.—C. D. LaMoree, Seattle, San Francisco, Los Angeles.

ELECTRICAL FACILITIES, INC., Oakland, Calif.—Thos. S. Wood, Seattle; A. F. Blecksmith, Los Angeles; Paul A. Douden & Co., Denver.

ELECTRICAL FITTINGS CORP., New York, N. Y.—Keeler-White Co., Seattle, San Francisco; Rutkin Electric Sales, Los Angeles.

ELECTRO ACOUSTICS PRODUCTS CO., Fort Wayne, Ind.—L. H. Bushnell, San Francisco.

ELECTRO HOT HEATER CO., Tacoma, Wash.—Branch Offices: Seattle.

ELECTROLINE COMPANY, Chicago, Ill.—D. H. Lundin & Co., Seattle; W. D. Howze, Los Angeles; J. L. Hansen, Denver.

ELFSTROM COMPANY, W. B., Los Angeles, Calif.

ELLIOTT COMPANY, Pittsburgh, Pa.—District Offices: San Francisco, Los Angeles.

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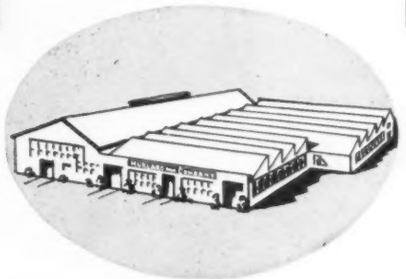

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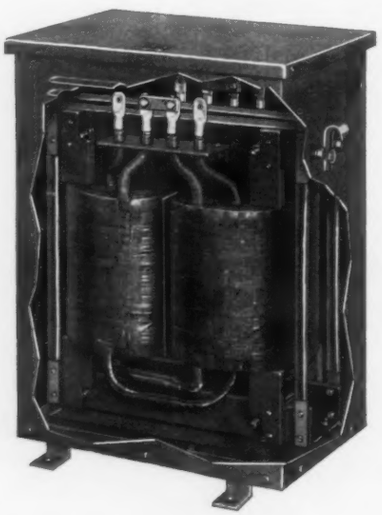

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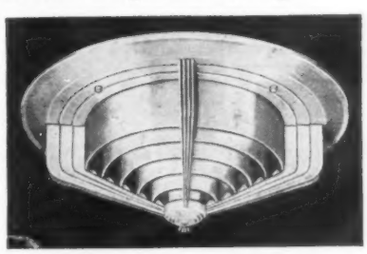

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NUTYPE

MATTHEWS CONDUCTOR CONNECTORS

◆

Made in two styles for electrical connections

NUTYPE—Split Bolt Type, made in 12 sizes, for No. 10 and smaller, to 1,000,000 CM copper wires, 97 to 99% copper content, great strength and ease of installation are features.

UNIVISE—"One-piece" type, made in 7 sizes, for No. 10 and smaller, to No. 4/0 copper wires. Cannot come apart or be cross threaded. High strength, 97% copper content metal used throughout. Easily connected and disconnected.

BOTH types eliminate the use of solder in any type of electrical wire connection. Samples and bulletins giving complete information will be sent on request.

W. N. Matthews Corp. St. Louis, Mo.

UNIVISE

Porcelain Housed Matthews Cutouts

Matthews Fuswitches and Cutouts

For Primary Distribution Transformer Fusing Protection

Open Type Matthews Fuswitches

● Matthews Cutouts and Fuswitches are made in enclosed and Open Types, both dropout and non-dropout styles. Enclosed types furnished in 14 catalog numbers for all ratings to 200 amperes and 7500/12,500 GRD. Y volts.
Open types furnished in 20 catalog numbers for all ratings to 100 amperes and 23,000 volts.
Reclosing Fuswitches, convertible disconnecting blades for above Cutouts, and Disconnecting Switches in several styles are included in the complete line.
Matthews Universal Fuse Links supplied for above, will also fit other makes.
All above comply with E.E.I.-N.E.M.A. 100% rating standards.
Write for complete descriptive catalog.

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General Elec. Co.
General Elec. Supply Corp.
Kelvinator Corp.
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Sangamo Electric Co.
The Tork Clock Co.
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Kearney Corp., James R.
Line Material Co.
W. N. Matthews Corp.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.
L. W. Thompson
Westinghouse Elec. & Mfg. Co
Tom Wood

Switches, Fuse
General Elec. Co.
Kearney Corp., James R.
W. N. Matthews Corp.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.

Switches, Heater
General Elec. Co.

Switches, High Tension
Bowie Switch Co.
Condon & Young
James R. Kearney Corp.
Pacific Elec. Mfg. Co.
Schweitzer & Conrad, Inc.

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Meyers Safety Switch Co., Inc.
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Square D Co.
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General Elec. Co.
Maydwell & Hartzell, Inc.
Sangamo Elec. Co.
The Tork Clock Co., Inc.

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Moloney Electric Co.
Roller-Smith Co.
Wagner Electric Corp.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.
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L. A. Nott
Roller-Smith Co.
Sangamo Elec. Co.
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General Elec. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Copperweld Steel Co.
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Crucible Steel Co.
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Hazard Ins. Wire Works
Indiana Steel & Wire Co.
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Triangle Conduit & Cable Co., Inc.
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General Elec. Supply Corp.
Graybar Elec. Co., Inc.
McGill Mfg. Co.
Westinghouse Elec. Supply Co.

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Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

APRIL

ELECTRIC REFRIGERATOR CAMPAIGN

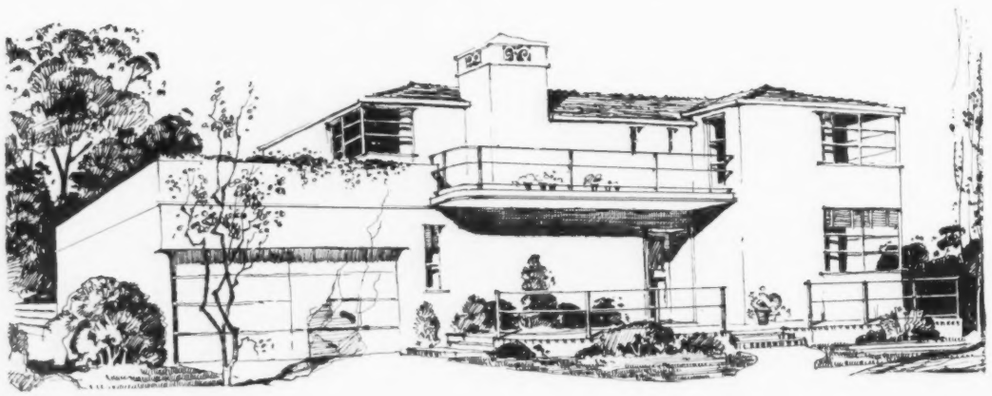
From April 10 to May 6, inclusive, the big event in P. G. and E. electric territory will be the **spring refrigerator campaign.** Under the sponsorship of the Electric Appliance Society, which itself is providing nearly $6000.00 worth of publicity and dealer sales-helps, the entire industry will band together in a 27-day demonstration of cooperative promotion. This company is giving office space for displays of dealer refrigerators, stickers on company bills—and 3 big newspaper advertisements in 287 daily and weekly papers. **A money investment of nearly $12,700.**

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

F-W 104-439

A NEW HOME

In Your Town



IT should mean business for you. It should require plenty of electric appliances and electric service. BUT IT WON'T. It might as well be padlocked and vacant as far as your business is concerned. It's wiring is fifteen years behind the times.

No matter how prosperous the family that lives in it, you're going to find this house locked tight against any new electrical appliances or service.

No, they don't want a new vacuum cleaner no matter what its advantages or how reasonable the price. The old one is used only when absolutely necessary as lamps must be disconnected and the clock stops every time the vacuum is used.

No, they don't want any more lamps. There are three-way plugs at every outlet now and cords strung under the edges and around corners of every rug.

No, they won't buy an air-conditioning unit for the living room or any other room, now, nor next year nor the next. It would mean a sizeable bill for extra wiring in addition to the cost of the unit.

And so forth through the whole gamut of appliances, and service.

If this were the only house in your territory that shut its doors to your merchandise or service for the next umpsteen years, it wouldn't be very important to you. But this is only an isolated example of scores of homes BUILDING RIGHT NOW—NOT in Timbuctoo, NOT in Kalamazoo, NOT in Little Rock, but in YOUR territory.

Builders build houses to sell. The houses they build will all be adequately wired when the buying public learns to check up on the wiring before buying.

There's a way you can prevent this bottlenecking of your future business. Tell every individual you can reach about the importance of adequate wiring. Tell them in person, tell them in letters, tell them in printed matter, tell them in radio programs, tell them in skywriting a mile high if you wish,—but TELL them.

4-39

PACIFIC COAST *Electrical* BUREAU

447 SUTTER STREET, SAN FRANCISCO • 601 WEST 5TH STREET, LOS ANGELES

ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

MAY 1939

McGraw-Hill Co. of Calif.

THE ACTUAL COST OF COOKING THE 3 DAYS' MEALS FOR FOUR PEOPLE WAS
19¼¢
OR AN AVERAGE OF 6 5/12¢ A DAY
OR 2 5/36¢ PER MEAL
BREAKFAST
LUNCH
DINNER
FIRST DAY MEALS
HOW CLOSE IS YOUR GUESS?
Results of EDISON "DISCOVERY" SURVEY OF ELECTRIC COOKING COSTS
ELECTRIC COOKING COSTS ½ AS MUCH AS YOU THINK
DISCOVERY MONTH
You'll be amazed AT THE ECONOMY OF ELECTRIC COOKING AND THE IMPROVED RESULTS
38,7 EDISON HOMES COOK ELECTRICALLY NOW
FREE... THIS "Wear-Ever" ALUMINUM COOKIE SHEET
What Do You Think It Would Cost to Cook Electrically These Three Days' Meals for Four People?
MY ESTIMATE IS

Edison Promotion

CONTINUES TO SELL THE ECONOMY OF ELECTRIC COOKING

★ Today's housewives are interested in electric cookery . . . . They are becoming increasingly aware of its economy . . . . These are the conditions shown by a recent Edison Company "Discovery Survey." More than 4,000 women responded to an invitation to estimate the cost of cooking three days' meals on an electric range. The majority of the replies closely approximated the correct figure.

This is another Edison Company activity which is helping to bring Southern and Central California housewives closer to the purchase of an electric range. It is a unit in a continuous promotional and advertising program which benefits all members of the electrical industry.

5-39

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), May, 1939, Vol. 82, No. 5. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
Copyright, 1939. McGraw-Hill Company of California.

PROGRESS IN G-E WATTHOUR METERS

What 50 Years Have Brought

THIS year, 1939, marks the fiftieth anniversary of the watthour meter. In 1889, the *first* watthour meter—the Type TRW—passed test and was put into service.

During all this time General Electric has made many valuable contributions to meter progress. Some were milestones — such as the Types I, I-14, I-16, I-20, and I-30. These and many other minor developments have resulted in improvements that benefit the industry.

Performance curves were flattened out and extended. Variations in power-factor, temperature, voltage, and frequency had less and less effect on accuracy. Installation became easier, energy diversion harder, and maintenance costs less. New designs kept pace with increasingly complex demands. And—prices decreased.

Even since the introduction of the Type I-30, late in 1937, detailed modifications have contributed to a continually improved product.

What has made possible this progress in the I-30? Minor changes in design and in manufacturing, new high standards of workmanship, new methods of testing and of controlling quality, and, in general, more careful attention to every detail. All these add up to the reason why today's meter is better than yesterday's; why tomorrow's will be even better. This progress will continue.

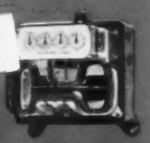
An Invitation

These improvements are interesting. So, too, is the whole process in the manufacture of a watthour meter. If you have never been through the G-E meter factory at Lynn, Mass., we think you'll find the trip profitable. You are cordially invited to make it.

1889

TYPE TRW—The FIRST watthour meter. The Thomson recording wattmeter for d-c and a-c service

1904



TYPE I—The predecessor of the modern high-torque induction-type watthour meter

1914

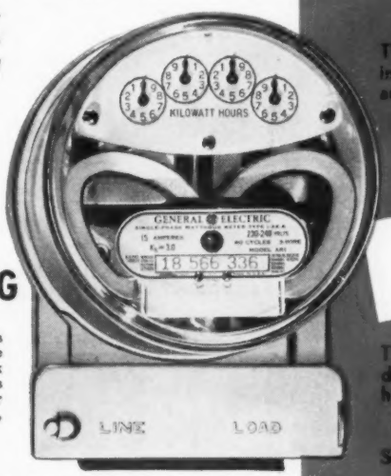
TYPE I-14—This meter made possible a marked price reduction

1926

TYPE I-16—The FIRST watthour meter giving long-range performance with high accuracy

1934

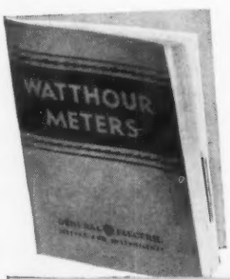
TYPE I-20—Modern mountings to meet modern installation and wiring practices



1939

TYPE I-30—The meter of today—the WIDE-LIMIT watthour meter. Introduced in 1937

See the G-E "House of Magic" at Both Fairs



NEW CATALOG

This is the 1939 edition. It contains descriptions and prices of all the latest G-E watthour meters. Ask for Catalog GEA-615. Address the nearest G-E sales office or General Electric, Dept. 6—201, Schenectady, N. Y.

HEADQUARTERS FOR ELECTRICAL MEASUREMENT

GENERAL ELECTRIC

400-34

BETWEEN THIS MONTH'S COVERS

Question Mark

THE BIG IF'S OF TELEVISION (p. 19): Among other questions being asked about the world's most widely heralded, new form of entertainment is this: "What will television do to or for the electrical industry?" No one knows for sure. Despite the existence of several television broadcasting stations in the West, Westerners are inclined to hold back their enthusiasm. In the first place, the topography of the largest

O. W. HOLDEN

Western cities is not conducive to first-rate transmission. The relative scarcity of 100,000-population areas limits the scope of television. Only seven stations can operate in any 100-mi. area. Transmitting and receiving equipment is still far from the height of perfection. And the cost of this equipment is in many cases prohibitive. Nevertheless, the West soon will have television.

Distributing to Cities

URBAN DISTRIBUTION SYMPOSIUM (p. 22): As load densities increase, will the cost of distributing one kilowatt to an urban center rise or fall? If it is to be kept from rising, the distribution engineer must work with ever increasing resourcefulness. S. J. Lisberger, chief of P. G. & E.'s electric distribution division, outlines ways in which his company is striving for ever greater distribution economy. O. W. Holden, Los Angeles Bureau engineer, points to other factors affecting costs. A tabulation of distribution practices by Western systems shows many schemes for affecting economy, and also shows wide divergence in practice between systems. Consulting editor for the symposium is John Bankus, Portland General Electric's well-informed assistant chief engineer.

Sales Parade

UTILITY RANGE AND WATER HEATER POLICIES (p. 32): This will be another big range and water heater year in the Far West. Here is an analysis of the policies and merchandising techniques to be used by the industry in selling 59,000 ranges and 29,000 water heaters. Plans for individual territories are reported so that comparisons can be made. Individual techniques are presented. So are merchandising ideas that may be applied with profit.

Meetings

ASSOCIATIONS (p. 44): Because the San Francisco ballot on municipal ownership conflicted with the date of the PCEA's annual convention at Del Monte, the meeting has been shifted to Pasadena, May 24-26. . . . California contractors last month held their first state-wide meeting in several years. Virtually every minute of the session was given over to discussion of laws and labor and how they affect business.

Rural Loadbuilding

IRRADIATION (p. 46): A new and growing electrical application in the dairy industry is the irradiation of milk to increase vitamin D content. Experiments have shown that by causing the milk to flow past a powerful source of ultra-violet radiation, this vitamin is materially increased. This, in turn, means healthier children. It is of vital importance, therefore, that a new irradiator having larger capacity and positive action has been developed.

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Cover: A Southern California Edison lineman gives lessons in kite-flying

What Price?

COST OF LIGHT FROM MODERN SOURCES (p. 47): What is the over-all cost of lighting a store or a home or an office? This is an important question, because too often we think of the cost of lighting as the cost of electricity used per hour. Actually, in measuring light's cost, we should include cost of the fixture in place, relamping and maintenance. Such is the claim of the author, W. P. Bear, illuminating engineer for

S. J. LISBERGER

Pacific Gas and Electric Co. Bear has been with P.G.&E.'s power and lighting sales department for the past 13 years. Prior to 1925 he was with Sanderson & Porter, consulting engineers, in Chicago. In eight years of utility and industrial valuation work he participated in $880,000,000 of valuations. Before Sanderson & Porter, he was connected with Day & Zimmerman, Philadelphia consulting engineers.

Convention-in-Print

NEXT MONTH: Once a year ELECTRICAL WEST really spreads itself. Therefore, be sure you get the June issue. Number of pages will be doubled to give you the broadest possible detailed account of electrical work in the West. What's happened during the past 12 months in selling. What's happened in engineering. How about contracting, management, distributing? The June issue is called the Convention-in-Print. Experts from all types of electrical jobs are writing for its pages. In addition, papers and discussions of the West's leading associations will be printed. The June issue will bring you facts that will simplify, improve your work. Watch for it.

Mrs. Jones **expects** your service to cook the dinner and warm the baby's milk . . . Farmer Smith **expects** your power to pump his water and churn his butter . . . they take it for granted the power will be there when the switch is snapped. With the growing use of electricity in every human activity it becomes increasingly important that this customer confidence in electric service be maintained. That is why the remarkably trouble-free service record of L-M Transformers is more and more a prime consideration with men who buy transformers. The design, workmanship and materials that go into L-M Transformers are of a quality that **assures** extra years of trouble-free, low cost service. Your L-M representative will gladly give you further information.

LINE MATERIAL CO.

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AIR COOLED TRANSFORMERS

● With a Jeffries Air Cooled Transformer money can be saved. The Air Cooled construction lengthens the life of the transformer and lowers repair costs. Plant expansion and extension can be made economically for a Jeffries Transformer provides the voltage change at the point desired without the need of long and expensive conduit runs. Besides a complete line of standard transformers, special designs and voltage furnished to order. Type S. S. Transformer 1 to 5 K. V. A. illustrated.

JEFFRIES TRANSFORMER COMPANY
5706 LONG BEACH AVE., LOS ANGELES

NEW PRODUCTS

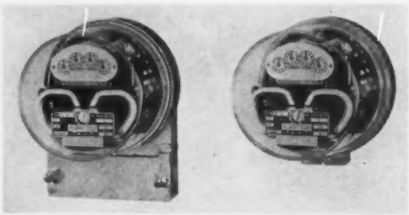
Frequency Meter (551)

Roller-Smith Co. has announced the addition to its line of 4-in. instruments of a 4-in. square frequency meter. Mechanism is an electro-magnet; scale length, 3 5/16 in.; accuracy, ¼ of 1 cycle. It is available with a

metal case for surface mounting; with a bakelite case for flush mounting. Four sizes are offered, varying from 100-125 volts to 225-250 volts.

Watthour Meter (552)

New single-disk, three-element watthour meter has been developed by Sangamo Electric Co. Designated as Type 1-3, these meters are built with three complete electro-magnetic



elements for use on four-wire, three-phase circuits. There are two types: One bottom-connected with standard polyphase terminal block, the other for socket mounting. Small and compact in size, their electrical characteristics are said to meet all modern metering requirements.

Service Cable Head (553)

Principle of Kwikon Co.'s new service entrance cable head is to prevent the entrance of rain and moisture through the cable to both the meter and testing equipment. This it accomplishes by terminating the cable end in a fixed, downward position. In addition to obviating the expense and annoyance of repairing meters and testing equipment damaged by water, the cable head is said also to save on wiring time.

Voice-Powered Telephone (554)

Chief application of Telfair Telfone Corp.'s non-magnetic, voice-powered telephone is for intercommunicating service in offices, plants and factories. It is said, however, that the phone has also been found useful in locations where noise offers a problem. This is notably true in turbo-generator rooms. Rochelle salt crystals are the voice-carrying medium, batteries being used for the signaling scheme used—bells, buzzers, horns or other equipment. Selective ringing and talking between stations is provided for by the device. For example, on a 12-station system, six two-way conversations may be carried on at the same time.

Shaver Filter (555)

Most electric shavers act as miniature radio transmitters and feed interference energy into the wiring. This is picked up by the radio receiver and mars normal program reception. Designed to absorb this energy is J. W. Miller

No 7817

Co.'s shaver filter, consisting of two duo-lateral wound chokes of 0.3 mf. inductance and a condenser of .03 mfd. A choke is connected in series with each side of the line and the condenser is connected across the line at the receptacle terminals. This circuit not only provides a high degree of attenuation to the interference energy, but also does away with the possibility of an electric shock to the user whose hands may be damp.

Insulated Clevis Assemblies (556)

Three types of insulated clevis assemblies, designed for various applications on distribution and rural lines, have been brought out by Ohio Brass Co. One type is for dead-ending and corner construction of secondary circuits; the other two are larger and suitable for primary circuit dead-ends and corner construction, series street-lighting circuits and other applications. The spools are made of wet process porcelain and have high electrical and mechanical values. They have a tapered

(Continued on page 7)

When requesting more information on New Product and Product Data items cut out this coupon, paste it on the back of a postcard and mail to

Electrical West
883 Mission Street
San Francisco, California

Please send me the following CHECKED items:

New Products:	551	552	553	554	555	556	557	558
			559	560	561	562	563	564
Product Data:	501	502	503	504	505	506	507	508
					509	510	511	512

Name .....

Address .....

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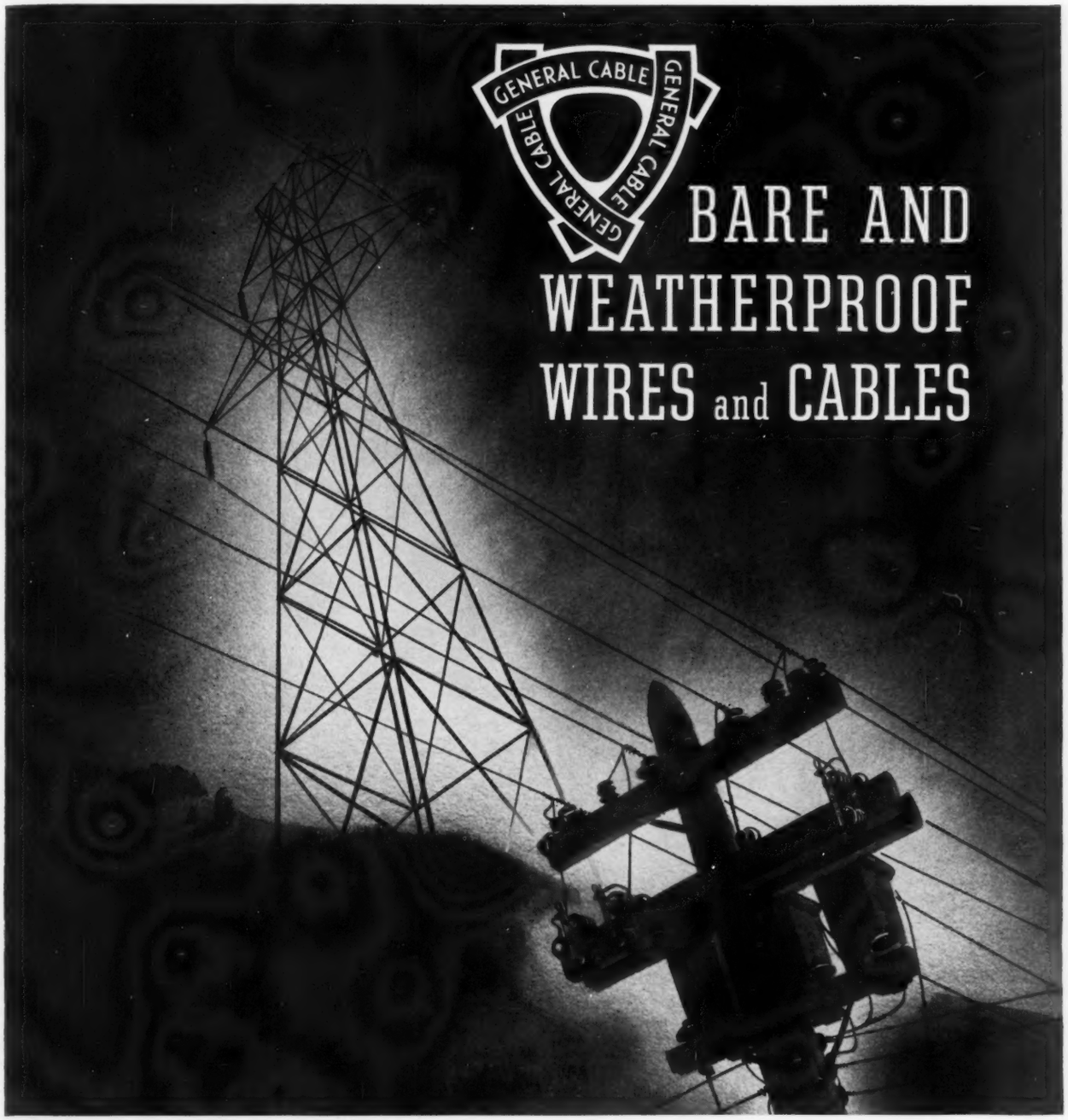

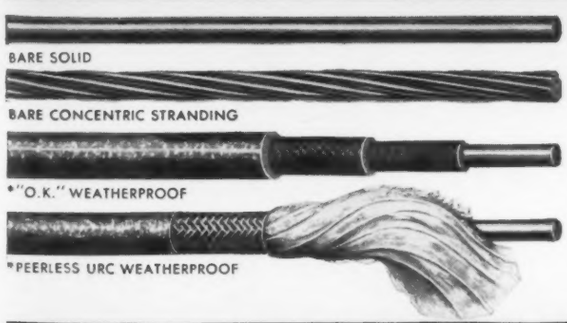

For high line transmission, and for distribution systems, General Cable supplies the RIGHT conductor for every varied operating requirement

*Trade-Mark

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General Cable Corporation Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT
KANSAS CITY (MO.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROME (N.Y.) • ST. LOUIS • SAN FRANCISCO • SEATTLE • WASHINGTON (D.C.)

A SALES AND PROFIT PRODUCING

Combination Offer

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Wrinkle-proof

AUTOMATIC IRON

and RID-JID Ironing Table with Zim Iron Rest

The finest ironing day equipment that can be bought at a $3.70 saving to consumers.

This Modern, Speedlined, Automatic, Lightweight Iron has a 20% larger ironing surface for quicker, easier work and the famous UNIVERSAL Wrinkle-Proof Round Heel which prevents back stroke wrinkles.

A PROVEN SALES PRODUCER

Teamed with this Popular UNIVERSAL Iron is the "Superbilt" Ironing Table — a combination that represents a bargain we can seldom offer. Order at once — Offer is for a LIMITED TIME ONLY.

ZIM METAL IRON REST

Extends beyond end of table giving maximum space for folding sheets.

REGULAR PRICE $13.65

SPECIAL PRICE $9.95

WITH OLD IRON

FOR LIMITED TIME ONLY

UNIVERSAL

AUTOMATIC

ELECTRIC IRON

Round Heel Prevents Back Stroke Wrinkling

LANDERS, FRARY & CLARK NEW BRITAIN, CONNECTICUT

hole which distributes loads more evenly and minimizes the possibility of spool breakage should the bolt be deflected under heavy mechanical load. The clevises are made of steel. On the larger assemblies, the clevis is off-set near the spool, increasing the flashover value of the units.

Motor Starter & Breaker (557)

An improved design of their Type AP-7DB combination motor starter and circuit breaker is announced by Allis-Chalmers. The device consists of a standard starter unit combined with an enclosed-type air circuit breaker mounted in a metal case. The starter unit is suitable for 7½-hp., 550-volt motors or smaller units. The circuit breaker has an interrupting capacity of 5,000 r.m.s. amp. in the 220-volt starters and 10,000 r.m.s amp. in the 440- and 500-volt starters.

Panelboard Breaker (558)

A new fully electro magnetic circuit breaker for assembly in lighting panelboards, as used in homes, stores, factories, etc., has been developed by Heinemann Electric Co. This breaker with fully magnetic inverse time delay operates without thermal elements. Magnetic trip with time delay gives delayed trip on harmless overloads and instantaneous trip on short circuits. In can be had in 10-, 15-, 25-, 35-, and 50-amp. sizes to operate on 125 volts a.c.

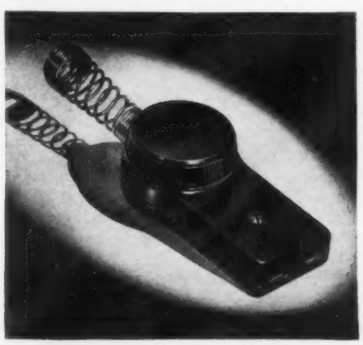
Fluorescent Desk Lamp (559)

The new I-EZE desk lamp is said to provide three times more light than the ordinary lamp because of a specially treated reflecting surface and the greater light output of its 15-watt fluorescent bulb. The lamp gives ample light and is more comfortable to use because of the little heat generated by the bulb. The lamps, manufactured by Artistic Lamp Mfg. Co., may be had in either period or modern design.

Air Circuit Breaker (560)

An air circuit breaker has been announced by General Electric for use with its standard, vertical-lift type metal-clad switch-gear. Called the "Magne-blast," the new breaker has been developed for 5,000-volt, three-phase service. Unique interrupting characteristics are claimed for the breaker. When the contacts part, the arc is magnetically driven into a specially constructed chute which confines and speedily interrupts the arc. This operating principle so improves the power factor of the fault, says G-E, that when interruption occurs the power factor at interruption is close to unity.

Appliance Plug (561)



The new Handy appliance plug manufactured by Albany Sales Co. is said to be as easy to use as the original Handy plug. The

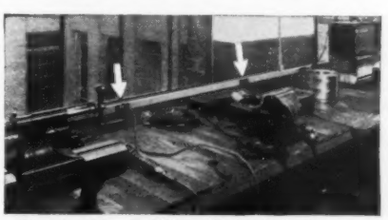
(Continued on Page 8)

WIREMOLD *opens* FACTORY DOORS
FOR ALERT ELECTRICAL CONTRACTORS

Use the help that Wiremold can give you in going after profitable industrial business. With "Pancake", the Wiremold Overfloor Wiring System, you can sell a real production-cost cutting service to manufacturers.

Photograph shows installation of Wiremold Overfloor Wiring System in a factory.

Show them how this easily installed modern wiring brings current to work where they want it, quickly, economically and without costly alterations.



Showing Plugmold installation bringing convenient electrical outlets for easy accessibility to bench equipment.

Show them how Plugmold, The Wiremold Multi-Outlet Assembly makes outlets accessible for portable lights or small motor driven equipment on benches and inspection racks.

Show them how the New Wiremold Fluorescent Lighting Strip brings BETTER LIGHT . . . "PLUS" LIGHT to many exacting seeing tasks.

Reach out for this profitable business and take advantage of the help that Wiremold Engineers can give you in securing it.

Here are Wiremold data sheets showing industrial applications of The Wiremold System — Take advantage of this help in your selling.

GEORGE A. GRAY, 1250-1252 Folsom St., San Francisco, Cal.
FRANK J. AIREY CO., 1855 Industrial St., Los Angeles, Cal.
F. A. STROHECKER, 2207 First Ave., South, Seattle, Wash.

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TRANSFORMERS, POWER AND DISTRIBUTION
Gardner Electric Manufacturing Co.
CURRENT TRANSFORMERS, NIAGARA AIR INSULATED
Lee Skipwith Company
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TREE SURGEONS' TOOLS
Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES
Clifton Manufacturing Co.
METER JEWELS
Herman D. Steel Company
SAFETY LINE TOOLS
Burnham Line Tool Company

Flash!

P. C. E. A. MOVES CONVENTION to HOTEL HUNTINGTON

May 24-26, 1939

Back to the Huntington! Back to the P.C.E.A. Convention Headquarters of previous years, where the finest accommodations are provided. To get the most business and pleasure out of the '39 P.C.E.A. Convention stay at the Huntington Hotel. You'll enjoy three stimulating days and it will pay you to be in the "center of things." You will renew business acquaintances and join in Convention activities under invigorating surroundings.

Bring the Family

Let your family in on the treat. Children and adults alike will enjoy the restful comfort, thoughtful service, splendid meals, and abundant recreational facilities.

With its fairyland of flowers and trees, Hotel Huntington is easily the ideal vacation spot for your family. So do BOTH jobs in comfort—both profit and play at the '39 P.C.E.A. Convention, May 24 to 26, by staying at the hotel where ideal service and accommodations are available.

Special Convention Rates—To those attending the P.C.E.A. Convention American plan rates will be $8.00 a day, $7.00 each for two in a room with bath. Send in your reservation early direct to Hotel Huntington, S. W. Royce, Manager.

The **Huntington**

PASADENA, CALIFORNIA

OFFICIAL P.C.E.A. CONVENTION HEADQUARTERS

cap is removed, wires are merely separated and inserted, cap is replaced and the plug is ready for use. The plug is trouble-proof in that it cannot be taken apart except for the cap. Retail price is 25c.

A.C. Welder (562)

The Midget Marvel Flexarc a.c. welder, comprising a special transformer and control for a.c. arc welding, has just been introduced by Westinghouse. Specifications for the welder are: current range 30-140 amp.; coated-electrode capacity, 1/16 to 5/32 in. diameter; current adjustment, 12 steps; frequency, 60 cycles; secondary open-circuit voltage, 50 volts on low range, 55 on high range. The unit is designed to meet the demand for a low-priced welder for all-round maintenance and shop work, as well as light construction work.

"Frequent Reverse" Motor (563)

Offered by Sterling Electric Motors is a new line of motors developed to simplify machine designs requiring frequent reversals in direction of rotation. The company claims that this squirrel-cage motor with control will stand up under continual and frequent reversals (as high as one per second) at full voltage without undue heating or deterioration. Stator and rotor windings are cooled with continuous forced ventilation in the form of a small auxiliary motor and squirrel-cage fan at one end of the motor. The unit is available in a number of sizes and speeds up to 10 hp.

Portable Ironer (564)

Announced last month by Landers, Frary & Clark was a new portable ironer weighing only 28 lb. The ironer has thermostat control providing high, medium and low heats between 250 and 450 deg. A cut-off switch permits operation on stored heat without disconnecting the ironer. The 5-in. roll with an open end can be turned in either direction. Entire operation is controlled by a single hand lever. The full-floating, chromium-plated shoe heats quickly and evenly. Ironing pressure is equalized at 50 lb. The motor is direct-connected to roll.

PRODUCT DATA

501:

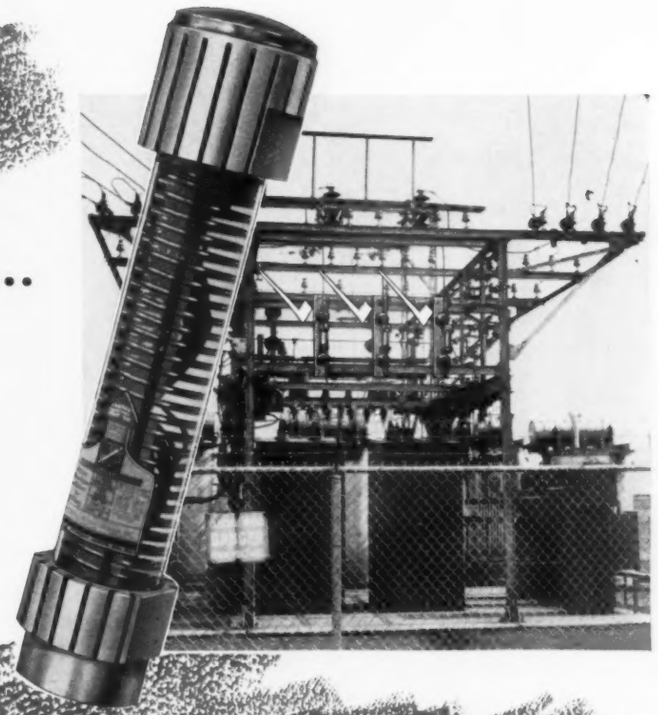
OIL CIRCUIT BREAKERS with motor-wound, spring-actuated MK-1 control have three big advantages, Pacific Electric Mfg. Corp. says in its new bulletin. They are fast opening and reclosing because of motor control; they are reliable because of sound design and quality construction; they are easy to install because they're shipped as a unit. Text and pictures tell the story. Clip the coupon and ask for bulletin No. 501.

502:

"LIGHTING for Production in the Factory" is a General Electric bulletin discussing the factory lighting problem in terms of new knowledge in seeing. A thick booklet with lots of sound advice, it contains various suggestions which should be of practical value to all lighting men. One table gives the recommended standards of illumination for industrial interiors. Other pages give advice on supplementary lighting for critical seeing tasks, stress the importance of adequate wiring and maintenance, etc. This is a valuable booklet, so send for No. 502.

(Continued on Page 10)

YOUR FUSE LINKS ARE JUST AS IMPORTANT TO YOUR DISTRIBUTION SYSTEM...



AS YOUR S & C LIQUID FUSES ARE FOR YOUR STATIONS...

● The fuse link is the heart of the cutout—a fact well recognized by engineers . . . S & C Fuse Links give you dependability, accuracy, economy comparable to the fusible element embodied in S & C Liquid Fuses . . . Unnecessary outages are reduced to a minimum—service call and replacement expenses are cut—maximum economy is assured . . . Yes, your choice of Fuse Links is worthy of your careful consideration. S & C Links will serve you as well on your distribution system as S & C Liquid Fuses do on your transformer stations.

Write for our Bulletin 218 which explains the sound engineering back of S & C Links.

SCHWEITZER & CONRAD, INC.

4435 Ravenswood Ave., Chicago, Ill.

Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Ont.

WESTERN REPRESENTATIVES

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George E. Honn
420 Market Street

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Riter Engineering Co.,
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S&C

FUSE LINKS

THESE ARE

BRASS TACKS!

For three months now, we've been asking you in this space to look at General Electric's 1939 Fan Portfolio entitled, "Let's Get Down to Brass Tacks!" We hope that you've already done so, but just in case you haven't, here in brief, is the story that the Portfolio tells. (If this isn't "getting down to brass tacks" we'll gladly eat a handful of 'em!)

General Electric Fans have been consistently advertised to the public for a long period of years. Again this year, General Electric steps out with a forceful promotional program that is designed to do just one thing—help General Electric Fan Dealers sell more General Electric Fans.

Included in this year's kit of hard-hitting advertising helps—all of this material is free—you will find:

(A) A colorful action display that attracts attention—and customers!

(B) Smart catalogs that contain complete selling facts!

(C) Convincing direct-mail pieces that carry your message far and wide!

(D) Attention-getting newspaper mats for local use!

(E) Powerful national newspaper ads in more than 175 key cities!

Tie-in with G-E Fans this year! We offer you a respected name, an accepted product, and a consistent and effective advertising program. Do not these things enhance your profit opportunity? Don't delay. SIGN THE G-E FAN AGREEMENT—NOW!

FREE!

EVER SEE A BRASS TACK?

You've heard lots of people talk about Brass Tacks but did you ever see one? Paste this coupon on a penny post card and we will gladly send you one—solid brass and no fooling—free!

FAN SALES SECTION, APPLIANCE AND MERCHANDISE DEPARTMENT
GENERAL ELECTRIC CO., BRIDGEPORT, CONN.

FANS

Please send me one of those Brass Tacks.

Name.....

Street & No.....

City.....

GENERAL ELECTRIC

SEE THE G-E "HOUSE OF MAGIC" AT BOTH FAIRS

503:
F. W. WAKEFIELD BRASS CO.'s bulletin on lighting is more of a catalog. It gives general information on lighting, while playing up Wakefield fixtures. Various types of lighting units are completely described in the back of the book. Send for Bulletin 503.

504:
STREET LIGHTING is thoroughly covered in Holophane Co.'s new booklet. Among other things it answers such questions as: what is the relationship between brightness and illumination? Why is it so important to treat street lighting by locations, etc.? The booklet can serve as a useful handbook and source of general information for anyone entrusted with the responsibility of maintaining good street lighting. Write for No. 504.

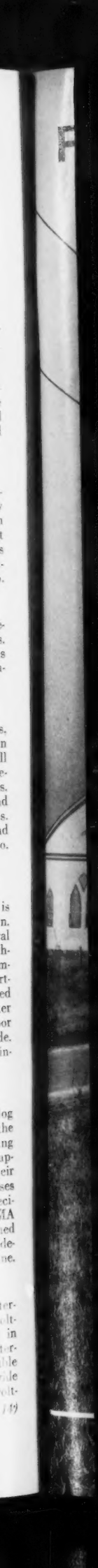
505:
TRANSFORMERS manufactured by Gardner Electric Mfg. Co. are briefly covered in a new 12-page pamphlet. Profusely illustrated with pictures of actual installations, the booklet gives some general information on Gardner's transformers and several pages of catalog matter. Write ELECTRICAL WEST for Bulletin 505.

506:
COMPLETE but not gaudy is Metropolitan Device Corp.'s catalog listing Murray switches. Several pages are devoted to box dimensions and knockout data. Virtually all items mentioned are illustrated. Write for No. 506.

507:
SINCE WARM weather will soon be upon us, fans are an interesting subject. Emerson Electric Mfg. Co. supplies grist for the mill with a 12-page catalog illustrating and describing its complete line of air circulators. Also offered is information on the use and installation of three- and four-blade fans. Detail construction features, performance and prices are given for all models. Check No. 507 on the coupon and the dope is yours.

508:
METAL-CLAD switchgear for indoor service is illustrated in Roller-Smith's latest bulletin. This switchgear is furnished in four general types: Open-front breaker compartment without instrument panel; open-front breaker compartment with panel door instrument compartment opposite breaker side; totally enclosed unit with instrument panel door on breaker side, and totally enclosed unit with panel door instrument compartment opposite breaker side. Ratings and dimensions for all types are included. Write for Bulletin 508.

509:
ROCKBESTOS PRODUCTS CORP.'s new catalog supersedes its 1936 edition. Included in the new edition are two complete indexes listing table letters and the wires to which they apply and listing the wires by name with their table letters; diversified information on uses and applications; an enlarged standard specification containing a summary of the NEMA standard for asbestos and asbestos-varnished cambric insulated wires and cables, and descriptions of the company's standard line.

510:
THE TYPE LR feeder voltage four-step booster-regulator designed to provide economic voltage regulation on rural lines is described in a new booklet by Westinghouse. The booster-regulator is said to be particularly applicable to conditions where load changes over a wide range cause considerable fluctuation in volt-

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